Vapor Intrusion Assessment Report

FTB-034 Northwestern Boundary Groundwater
Army Garrison-Fort Buchanan Army Reserves
Bayamon, Puerto Rico

Version: Final

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Acronyms

Acronym	Definition
ATc	Averaging time for carcinogens
ATnc	Averaging time for non-carcinogens
BTEX	Benzene, Toluene, Ethylbenzene, & Xylenes
CMS	Corrective Measures Study
COC	Chain of Custody
COCs	Contaminants of Concern
COPC	Contaminant of Potential Concern
CPR	Caribbean Petroleum Refinery
CR	Carcinogenic Risk
CSM	Conceptual Site Model
DCE	Dichloroethylene
DNAPL	Dense Non-Aqueous Phase Liquids
DoD	Department of Defense
DPW	Directorate of Public Works
EA	EA Engineering Science and Technology, Inc
ED	Exposure duration
EF	Exposure Frequency
ELAP	Environmental Laboratory Accreditation Program
ET	Exposure Time
g/L	grams/liter
GC/MS	Gas Chromatography/Mass Spectrometry
GVP	Gas Vapor Probe
H&P	H&P Mobile Geochemistry, Inc.
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
ID	Identification
ITRC	Interstate Technology and Regulatory Council
IUR	Inhalation Unit Risk
J&E	Johnson and Ettinger
LECR	Lifetime Excess Cancer Risk
LOD	Limit of Detection
LOQ	Limits of Quantitation
MCLs	Maximum Contaminant Levels
MEK	methyl ethyl ketone
MNA	Monitored Natural Attenuation
NFGs	National Functional Guidelines
NWBA	Northwest Boundary Area
OD	Outer Diameter
PBA	Performance Based Acquisition
PCE	Tetrachloroethene
PID	Photoionization Detector
PRASA	Puerto Rico Aqueduct and Sewer Authority
PVC	Polyvinyl Chloride
PX	Post Exchange
QC	Quality Control
QSM	Quality System Manual
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RfC	risk for carcinogens
RFI	RCRA Facility Investigation
RME	Reasonable Maximum Exposure
ROTC	Reserve Officer Training Corps

Acronym	Definition
RSL	Regional Screening Level
TCE	Trichloroethylene
TERA	Tri-Service Environmental Risk Assessment
TO	Task Order
TSCA	Toxic Substance Control Act
USEPA	US Environmental Protection Agency
VC	Vinyl Chloride
VI	Vapor Intrusion
VISL	Vapor Intrusion Screening Level
VIWP	VI Investigation Work Plan
VOC	Volatile Organic Compound

1 INTRODUCTION

KEMRON Environmental Services, Inc. (KEMRON) was awarded a Performance Based Acquisition Task Order (PBA TO) for two Army environmental database restoration sites at Fort Buchanan in Puerto Rico. As part of the PBA TO, KEMRON has been contracted to perform a vapor intrusion (VI) study at the Northwest Boundary Area Site (FTB-034) at Fort Buchanan in Bayamon, Puerto Rico. A VI Investigation Work Plan (WP) was prepared to detail the data collection and data analysis activities to conduct a VI assessment of the target occupied buildings at the site. The United States Environmental Protection Agency (USEPA) approved the VIWP in a letter dated 17 July 2014.

The scope of work includes investigating concentrations of volatile organic compounds (VOCs) in near-slab soil gas around buildings within a 100-foot radius of the chlorinated solvent groundwater plume, primarily composed of trichloroethene (TCE). The VI Study was designed to address the USEPA's September 2, 2010 letter titled *Technical Review of the September 2009 RCRA Facility Investigation Report* for the Northwest Boundary Area (NWBA) site requesting further evaluation of the vapor intrusion pathway for the site.

1.1 Vapor Intrusion Pathway

Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings. Volatile chemicals in buried wastes and/or contaminated groundwater can emit vapors that may migrate through subsurface soils and into indoor air spaces of overlying buildings in ways similar to that of radon gas seeping into homes. This pathway may be important for buildings both with and without a basement. The main concern is whether the chemicals may pose an unacceptable risk of chronic health effects due to long-term exposure.

Three conditions must exist for vapors to reach the interior of buildings from the subsurface soils or groundwater beneath or adjacent to a building:

1. A source of vapors must be present in the soil or in groundwater beneath or near a building.
2. Vapors must form and have a preferential pathway that permits migration toward the building.
3. Entry routes must exist to allow vapors to enter the building, as well as driving forces must exist to draw the vapors into the building.

If condition 1 is present at a site, the vapor intrusion pathway should be evaluated to determine if the remaining two conditions are present and if a complete pathway is present. To evaluate conditions 2 and 3, sub-slab or near-slab soil gas samples may be collected in or near a building where a source of vapors is present in soil or groundwater. In the event that all three of these conditions are present, then the vapor intrusion pathway is considered complete. Similarly, if any of the three conditions are not present, then vapor intrusion is an incomplete pathway. For vapor intrusion studies, inhabited structures are characterized by structures with enclosed air spaces that are designed for human occupancy (USEPA, 2002). Receptors would include anyone living or working in an enclosed space above soil or groundwater that is contaminated by VOCs (ITRC, 2007).

2 BACKGROUND

Fort Buchanan is a 746 acre installation located approximately six miles southwest of San Juan, Puerto Rico. The installation is located within two municipalities, namely Bayamon and Guaynabo (**Figure 1**).

Camp Buchanan was established in 1923 and later became Fort Buchanan in 1940. Historically the installation was used for maneuver training, range activities, as well as a supply depot. Fort Buchanan has been used as a maneuver training area and range, supply depot, and it has housed a command group that provided support for the United States (U.S.) Army Reserve, the National Guard, the Reserve Officer Training Corps (ROTC), and an Armed Forces Examining and Entrance Station and Intelligence Corps Detachment. In October 2003, Fort Buchanan became the reserve installation under the U.S. Army Reserve Command.

Currently, Fort Buchanan is a reserve installation with support to the reserve- and active-component soldiers in Puerto Rico and the U.S. Virgin Islands by providing mobilization, readiness, and actual deployment of soldiers. Additionally, the installation provides support to DoD operations in the Caribbean.

Fort Buchanan is located on the northern coastal plain of Puerto Rico and slopes gently upward (south) toward the Cordillera Central Mountains. The installation is bordered by Puma Energy Puerto Rico (formerly Caribbean Petroleum Refinery Company [CPR]) to the west, Roosevelt Avenue to the east (main gate), road PR-No. 2 to the south, and De Diego Expressway (PR-22) to the north (**Figure 2**).

The Northwest Boundary Area, also known as FTB-34 TCE groundwater site, is a groundwater plume on the northwestern boundary of the installation with an assumed source area to be located south of Building 539, the Armory building. In 2010, the TCE groundwater plume was located in the northwestern portion of the installation with the downgradient limits of the plume extending outside the installation boundary; however, the 2014 groundwater sampling event reported data to show that the plume no longer extended off the installation boundary but was confined to the northwest portion of the installation. The plume consists of chlorinated solvents, such as TCE, 1,2-dichloroethene (1,2-DCE), and vinyl chloride (VC).

2.1 Previous Investigations

A RCRA Facility Investigation (RFI) was initiated in the Northwest Boundary Area of Fort Buchanan at the request of USEPA in a February 11, 2005 letter issued after TCE was detected in groundwater on the adjacent CPR site off the installation boundary (**Figure 2**). USEPA requested Fort Buchanan perform investigations for potential source areas for TCE in groundwater on the Fort Buchanan property and determine the extent of VOCs in groundwater on the installation.

The Northwest Boundary Area RFI consisted of multiple phases that included soil sampling, geophysical investigations, test pitting, pore water and surface water sampling, monitoring well installation and groundwater monitoring. Test pits around geophysical anomalies did not identify a source in soil near the Directorate of Public Works (DPW), which was a suspected source. The RFI reported VOCs in soil below their screening levels, and not detectable in sediment pore water (EA, 2012a). However, chlorinated solvents were detected in groundwater.

Chemical groundwater data were generated from eight groundwater sampling events conducted over the course of the investigation (January 2007 through August 2010). Eighteen VOCs were detected at least once in groundwater samples, and 14 of them were found at concentrations above screening levels. No dense non-aqueous phase liquid (DNAPL) was detected in any of the wells. The VOCs that were detected with the greatest frequency and highest concentrations (relative to screening levels) are related to

the breakdown of tetrachloroethene (PCE): TCE, cis- and trans-1,2-Dichlrorethene (DCE), vinyl chloride, and finally ethene. The highest concentrations of PCE were found in wells MW-15 and MW-25 at concentrations ranging from 34.1 µg/L to 20.9 µg/L. The highest concentrations of TCE were also found in wells MW-25 and MW-26 with concentrations ranging from 1,150 µg/L to 4,040 µg/L in those two wells. Concentrations of 1,2-DCE detected in MW-25 ranged from 259 µg/L to 288 µg/L and MW-15 ranged from 53.1 µg/L to 66.9 µg/L. Vinyl chloride was also detected during the RFI with the highest concentrations found in samples from MW-7B, with concentrations ranging from 7.8 µg/L to 25.6 µg/L. The monitoring well network is illustrated on **Figure 3.**

Groundwater impacts are located within carbonate sand aquifers characterized by fine to large gravel (older deposits) and coarse sands. According to the Corrective Measures Study (CMS) finalized in September 2012, two distinct sand units (older terrace deposits) separated by a fine material are present in the southern portion of the plume, which dips below a younger sand unit (younger terrace deposits) that is present in the northern portion of the site. Moderate hydraulic communication between the younger and older terrace deposits exists.

2.2 Conceptual Site Model

A conceptual site model (CSM) has been developed to show potential sources of contamination, routes of migration, and receptors evaluated in the Human Health Risk Assessment (HHRA) provided in the RFI. The CSM identified two potentially complete exposure pathways present at the site. The two potentially complete pathways are:

- inhalation of indoor air by commercial workers from VOC vapor intrusion and
- ingestion of groundwater as a tap water source by off-site residents, although the area is served by public water supply provided by Puerto Rico Aqueduct and Sewer Authority (PRASA).

The potentially complete vapor intrusion pathway for the commercial worker was evaluated during the RFI (EA, 2012a) by modeling the vapor intrusion exposure pathway using groundwater data in USEPA's Johnson and Ettinger model (USEPA 2004) (J&E Model). The J&E model uses convective and diffusive mechanisms for estimating the transport of vapors migrating from groundwater into indoor air spaces located directly above the source of contamination. During the modeling, several conservative input parameters were used and the J&E model results indicated there are potential concerns for commercial workers who inhale indoor air due to vapor intrusion. The results of the model can be used as one line of evidence for the vapor intrusion pathway. The non-carcinogenic hazard index (HI) calculated in the HHRA for the commercial worker for exposure to indoor air was 2.7, which is above the USEPA threshold of 1.0. The carcinogenic risk for exposure to indoor air for the commercial work is $8.4x10^{-6}$, which is within the USEPA's acceptable risk range of 10^{-4} to 10^{-6}.

Due to the potentially complete exposure pathways and potential risk to human health from exposure to groundwater or the resulting volatile vapors, a CMS was prepared in 2012 to develop and evaluate potential corrective measure alternatives for addressing the chlorinated solvent groundwater plume within the Northwest Boundary Area of Fort Buchanan. The primary contributor to human health risk calculations is TCE. TCE contributes approximately 71% of carcinogenic risks and approximately 90% of non-carcinogenic hazards.

The Final CMS established an interim remedial goal of 100 µg/L for TCE in groundwater. Groundwater modeling performed during the preparation of the CMS determined that the interim remedial goal for TCE would result in groundwater achieving the applicable MCLs for PCE, TCE, 1,2-dichloroethene (DCE), and vinyl chloride (VC) within 30 years (EA, 2012b). The Federal Maximum Contaminant Limits (MCLs) were established as the Final Remedial Goal for the site. The selected corrective measure alternative in the CMS (Alternative 3) includes a combination of technologies, including in-situ enhanced

bioremediation, reductive dechlorination, and MNA as the preferred remedy to treat the portion of the TCE Plume exceeding 100 µg/L TCE.

As previously discussed above and documented in the Vapor Intrusion Work Plan (KEMRON 2014b), the soil gas sampling methodology and area of investigation was based off of the August 2010 groundwater data set obtained during the RFI. In anticipation of the upcoming Corrective Measures Implementation to treat the portions of the TCE Plume exceeding 100 µg/L TCE, a groundwater sampling event was conducted between July 28, 2014 and August 8, 2014 to provide data documenting current site groundwater conditions. The data obtained during the 2014 groundwater sampling event, which indicates that the TCE groundwater plume has substantially decreased in size, has been incorporated into Table 1 with the historical groundwater data and into applicable Figures of this Vapor Intrusion Assessment Report which depict the approximate extents of the TCE plume in 2014.

2.3 Land Use

The current land use at Fort Buchanan is designated for industrial, community, residential and recreational usage as illustrated on **Figure 4**. The NWBA Site has been designated for industrial or community land use and is maintained by Fort Buchanan through the Fort Buchanan Real Property Master Plan Digest (Fort Buchanan, 2010), which serves as the Installation Master Plan (for designating land use areas). The overall land use in the NWBA at Fort Buchanan is geared primarily toward industrial land use with a portion of this area occupied by the Puerto Rican Boa habitat. Areas designated for residential use within Fort Buchanan will remain residential or could be changed to industrial use; however, areas that are already designated for industrial land use are not expected to be re-zoned for residential land use. The protected Puerto Rican boa habitat will not be disturbed due to its endangered species status and initiative to preserve the sensitive habitat.

3 SOIL VAPOR SAMPLING ACTIVITIES

Section 3.0 presents a summary of field activities associated with the vapor intrusion assessment. The area for investigation was set to be a 100-foot radius of the edge of the 2010 dissolved TCE groundwater plume. A total of five buildings were included in the 100-foot radius of investigation:

- Building 539 – Fort Buchanan Armory
- Building 665 – Main Gate Guard House
- Building 670 – Visitor's Control Center
- Building 676 – Veterinary Clinic
- Building 689 – Post Exchange (PX)

The area of investigation and the subject buildings are depicted on **Figure 5**.

3.1 Pre-Sampling Inspection and Utility Locate

Prior to the start of sampling activities, a field reconnaissance was performed in which KEMRON personnel inspected the areas proposed for sampling. On August 14, 2014, KEMRON submitted three dig permits for the three building clusters associated with the VI sampling work. The dig permits were approved on September 11, 2014 by Fort Buchanan. Additionally, on September 12, 2014, KEMRON and GeoEnviroTech, Inc. located utilities in the proposed locations as presented in the June 2014 VIWP. Several proposed vapor implant locations had to be adjusted in the field to avoid subsurface utilities.

3.2 Piezometer Installation

A Geoprobe® 66 Series drill rig was used to advance three borings to determine the depth to groundwater at each building or building cluster – one boring near Building 539, one boring near Buildings 670 and 676, and one boring near the PX (Building 689). A temporary piezometer was installed in each boring. The three piezometers where advanced by direct push using one and a half inch Outer Diameter (OD) Rods and one inch Polyvinyl Chloride (PVC) riser and screens. The temporary piezometers were not completed with sand or bentonite surrounding the screen and riser. The three piezometers were installed as follows:

- PZ-1 was located north of the Visitor's Control Center - Building 670.
- PZ-2 was installed adjacent to the PX on the west side.
- PZ-3 was advanced north the Armory - Building 539.

The groundwater was allowed to recharge for 24 hours prior to measuring the groundwater elevation. All temporary piezometers were gauged using an electronic oil/water interface probe to determine the water table elevation after recharge. As stated in the VIWP, soil gas samples are designed to be collected three to five feet above the water table to avoid the collection of soil gas samples in the capillary fringe. The capillary fringe for the clay and silty clays at the site extends three to five feet above the water table. The depth to groundwater ranged from six feet below ground surface (bgs) at PZ-1 to approximately ten feet bgs at PZ-2 and PZ-3. Upon completion of the sampling event, the piezometers were removed with the boreholes being filled with cement. **Figure 6** depicts the locations where the piezometers were advanced.

3.3 Soil Gas Vapor Implant Installation

On September 15 and 16, 2014, a shallow soil gas implant was installed at each proposed location at a depth of either 2.5 or five feet below ground surface. It was not possible to advance soil gas vapor implants at multiple depths due to the shallow water table encountered near the buildings. The soil gas vapor implants were installed at the target buildings at the following depths:

Building	Piezometer	Depth to Water (ft. bgs)	Soil Gas Vapor Implant Installation Depth (ft. bgs)
Visitor's Control Center – 670, Vet Clinic – 676, Guard House - 665	PZ-1	6	2.5
PX – 689	PZ-2	10	5.0
Armory – 539	PZ-3	10.5	2.5*

** For the Armory Building 539, the initial implant depth was proposed to be five feet bgs based on the water level recorded from PZ-3. However, during the soil gas vapor implant installation on the north part of Building 539, groundwater was present at five feet bgs. Therefore, the soil gas implants were installed at 2.5 feet bgs to avoid moisture in the implant.*

The shallow implants were installed using a Geoprobe® 66 Series direct push drilling rig at the locations identified on **Figure 6**. If concrete or asphalt was at the ground surface, coring was performed to allow access to the soils beneath. The Geoprobe® 66 was used to advance the stainless steel Gas Vapor Probe (GVP) tip to a depth of 2.5 or 5 feet below ground surface. Nylaflow tubing was attached to the GVP tip for remote vapor sampling from the surface. Clean quartz sand was placed in the annular space between the borehole and the implant along the screen portion of the implant. The remaining annular space was sealed with hydrated bentonite granules.

Once all implants were installed, the vapor implants were allowed to cure for 24 hours prior to collecting soil vapor samples. This elapsed time allowed the subsurface to equilibrate, allowed the ground surface seal to cure and minimized the amount of purging that must occur prior to sample collections.

3.3.1 Helium Leak Testing

A helium leak test was performed on each vapor implant prior to sample collection to document the proper isolation of the soil vapor from ambient air. The leak test was performed in the field using a helium detection meter, high-grade helium gas from Linde Gas, and leak test chamber. An implant was considered "tight" if there is less than 20% of the helium concentration of the shroud measured in the soil vapor that is purged from the vapor implant. This 20% guideline is based on recommendation in the ITRC guidance entitled "Vapor Intrusion Pathway, A Practical Guideline" (ITRC, 2007). The helium leak test readings are included in the Sampling Checklist forms included in **Appendix A.**

3.3.2 Soil Vapor Sampling

After the helium leak test was performed, the soil vapor sampling was performed. The implants were purged three tubing volumes using a 60-ml disposable syringe. The syringe was in-line with the SUMMA® canister and was isolated by a three way valve. The three way valve was turned to purge the implant and then the valve was rotated 45 degrees to shut off the syringe. The SUMMA® canister was then opened and the sample is drawn into the SUMMA®.

Each canister was affixed with sample tags on the canisters and was labeled with the sample identification, date and time for sample collection. Additionally, the SUMMA® canisters and flow controllers laboratory ID were recorded to link them for laboratory quality control. The SUMMA® canister and flow controller laboratory IDs are included in the Sampling Checklist forms included in

Appendix A. Upon completion of the sampling event, the vapor implants were removed and the boreholes filled with cement.

3.3.3 Sample Shipment and Laboratory Analysis

On September 18, 2014, the canisters were shipped under chain of custody (COC) to H&P Mobile Geochemistry (DoD ELAP # L13-199) located in of Carlsbad, CA for analysis using USEPA method T0-15. The target analyte list for the vapor intrusion study has been developed based on preliminary screening of groundwater data through 2010 as presented on **Table 1.** Due to international shipment regulations, the SUMMA® canisters were accompanied by a Toxic Substance Control Act (TSCA) certification form and a commercial invoice placed in a sealed bag on the outside of the cooler. KEMRONs sample shipment procedure presented in the UFP-QAPP was followed.

3.4 Quality Assurance and Quality Control

Soil vapor sample analysis was performed using USEPA TO-15 methodology. This method uses a quadruple or ion-trap Gas Chromatograph/Mass Spectrophotometer (GC/MS) with a capillary column to provide optimum detection limits. The GC/MS system requires a 1-liter gas sample (which can easily be recovered from a 6-liter canister) to provide the specified detection limit (See UFP-QAPP KEMRON 2014). The 6-liter canister also provides several additional 1-liter samples in case subsequent re-analyses or dilutions are required. This system also offers the advantage of the GC/MS detector, which confirms the identity of detected compounds by evaluating their mass spectra. Two duplicate samples were collected as part of the sampling event.

3.5 Work Plan Deviations

The following deviations occurred from the proposed work plan (KEMRON 2014):

- Three soil vapor implant boring locations required offsetting due to subsurface utilities in the proposed areas. The three sample points that were affected included two samples proposed at Building 689 (PX) and one sample at Building 665 (Main Gate Guard House). The Building 689 sample locations were offset to the northwest while the Building 665 location was moved from the north side to the south side. The soil vapor implant locations as installed are illustrated on **Figure 6**.
- Deep soil gas samples could not be collected due to the depth to groundwater being measured at approximately five to ten feet bgs.

4 SOIL GAS RESULTS AND DATA ANALYSIS

Soil vapor samples were collected on September 17, 2014 to evaluate the presence of Chemicals of Potential Concern (COPCs) in the vadose zone. Samples were collected in accordance with the following documents:

- KEMRON, *NWBA Groundwater VI Investigation Work Plan* (KEMRON 2014b)
- USEPA, *Superfund Vapor Intrusion FAQS* (USEPA, 2012).
- Interstate Technology and Regulatory Council (ITRC), *Vapor Intrusion Pathway: A Practical Guide* (ITRC 2007).
- Department of Defense (DoD), *DoD Vapor Intrusion Handbook* (Tri-services Risk Assessment Workgroup, 2009).

This section summarizes the results from this sampling event.

4.1 Soil Gas Sample Results

KEMRON collected a total of 16 soil vapor samples on September 17, 2014 at the locations depicted on **Figure 6**. All samples were collected via methodologies presented in the *Vapor Intrusion Investigation Work Plan* (KEMRON 2014b) and analyzed for the standard USEPA Method TO-15 analyte list. A total of 30 different VOCs were present in at least one of the 16 samples collected. Of the target analytes, primarily chlorinated VOCS, PCE was detected in five out of 16 samples; TCE was detected in nine of 16 samples; 1,2-DCE was detected in nine of 16 samples; chloroform was detected in 14 of 16 samples; and vinyl chloride was detected in zero of 16 samples. PCE concentrations ranged from 3.4 µg/m^3 to 10 µg/m^3, TCE from 3.0 µg/m^3 to 7.7 µg/m^3, 1,2-DCE from 2.2 µg/m^3 to 4.5 µg/m^3, chloroform from 2.6 µg/m^3 to 58 µg/m^3.

Petroleum related VOCs were also detected in the soil gas samples such as benzene, toluene, ethylbenzene, xylenes (BTEX), and the two trimethylbenzene isomers. Benzene was detected in 15 of 16 samples; toluene was detected in 16 of 16 samples; ethylbenzene was detected in 15 of 16 samples; xylenes were detected in 15 of 16 samples; 1,2,4-trimethylbenzene was detected in 16 of 16 samples; and 1,3,5-trimethylbenzene was detected in 16 of 16 samples. Benzene concentrations ranged from 15 µg/m^3 to 190 µg/m^3, toluene from 38 µg/m^3 to 180 µg/m^3, ethylbenzene from 10 µg/m^3 to 480 µg/m^3, xylenes (m,p-xylenes) from 17 µg/m^3 to 1,900 µg/m^3. These petroleum related VOCs are not considered to be site related Contaminants of Concern (COC) associated with the TCE groundwater plume but are associated with anthropogenic sources and attributed to the commercial use of the area, particularly heavy vehicular traffic at the Visitor Control Center (Building 670), the Main Gate Guard House (Building 665), the Veterinary Clinic (Building 676), and the Post Exchange (Building 689). Minor drips, leaks, and spills from vehicles (delivery trucks, personal vehicles, Army vehicles, etc.) as well as exhaust from vehicles idling at the Main Gate Guard House (Building 665) and the associated fate and transport of these chemicals can contribute to shallow soil gas concentrations through natural processes such as advection and dispersion.

Other VOCs that were detected in at least nine of 16 samples include but are not limited to refrigerants (F11 and F12), acetone, bromodichloromethane, methylene chloride, carbon disulfide, styrene, and methyl ethyl ketone (MEK). These VOCs are not considered to be site related COCs associated with the TCE groundwater plume based upon current and historical groundwater data but are attributed to anthropogenic sources due to the commercial use of the area. Additionally, samples were collected at the approximate depth of buried municipal water source lines, which may account for the trihalomethane (chloroform, bromodichloromethane) detections. Results are summarized in **Table 2**, and the analytical laboratory report is provided as **Appendix B**.

The detected concentrations were compared with Target Sub-Slab and Exterior Soil Gas Concentrations presented in the USEPA Vapor Intrusion Screening Level (VISL) Calculator and User Guide (USEPA, 2014). The screening levels for groundwater and soil gas (either sub-slab gas or soil gas collected exterior to buildings) are calculated from the target indoor air concentrations using empirically-based conservative "generic" attenuation factors that reflect generally reasonable worst-case conditions as described in the USEPA's draft vapor intrusion guidance (USEPA 2002). The default, generic VISLs are based on default exposure parameters and factors that represent Reasonable Maximum Exposure (RME) conditions for long-term/chronic exposures. The target exterior soil gas VISLs were calculated utilizing a carcinogenic risk of 10^{-5} and 10^{-6}, commercial exposure scenario, and a Hazard Quotient (HQ) of 1.0. Four VOCs (Benzene, Bromodichloromethane, Chloroform, and Ethylbenzene,) were detected in soil gas at concentrations that exceed one of the two target soil gas VISLs based on lifetime excess cancer risk (LECR) levels. These four VOCs were retained as COPCs for further evaluation in the VISL calculator by building.

Four VOCs (1,3,5-Trimethylbenzene, 1,3-Dichlorobenzene, 4-Ethyltoluene, and trans-1,2-DCE) did not have VISLs target soil gas concentrations available due to no inhalation unit risk (IUR) being published or the VOC is not volatile enough to produce toxic vapors. No further action or data analysis will be completed for VOCs that were below the applicable VISL or did not have a VISL established.

Soil gas data from each individual building was screened against the target exterior soil gas VISLs to determine COPCs for each building. **Tables 2A through 2E** display the sample data and COPCs per Building in the VI Assessment. **Figure 7** illustrates the soil gas detections that were above the default VISL screening levels. The COPC list is summarized in the table below:

Analyte	Building 539	Building 665	Building 670	Building 676	Building 689
Benzene	COPC	COPC	COPC	COPC	COPC
Bromodichloromethane	—	—	COPC	—	COPC
Chloroform	COPC	—	COPC	COPC	COPC
Ethylbenzene	—	—	—	COPC	COPC

4.1.1 Helium Tracer

A tracer vapor compound (helium) was used during the soil vapor sampling process to evaluate potential leakage of atmospheric air into the SUMMA® canisters used to collect the soil vapor samples. After the tubing was connected with the SUMMA® canisters and purging was complete, plastic sheeting was placed around the borehole, and helium was added beneath the sheeting near the top of the boring next to the bentonite/clay-sealed sampling point. A field helium detector soil vapor probe was used to evaluate potential seal issues. The data indicated that there was no evidence of outside infiltration. In addition, a photoionization detector (PID) was used to monitor atmospheric background prior to and during sample collection. Four samples registered PID readings with concentrations ranging from 100 ppm at Building 689 West Side (W3) to 2,450 ppm at Building 676 West Side.

4.1.2 Quality Assurance Review

Upon the receipt of the laboratory data report, a chemist(s) not employed by the analytical laboratory, a KEMRON project chemist, validated the data generated by the contract laboratory. Following the independent data validation, the laboratory data package was sent to a Puerto Rican licensed chemist for review and certification. The applicable analytical methods and the following document will be used to validate all data generated by the laboratory:

- USEPA. 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review. USEPA 540/R-99-008 (October 1999).
- DoD, 2010. DoD Quality Systems Manual (QSM), Version 4.2, DoD, October 2010.

The analytical results for all field, quality control, and laboratory quality assurance samples were evaluated. The data were reviewed to determine the integrity of the reported analytical results and ensure the data met data quality objectives. **Appendix C** presents a complete quality assurance review of the analytical data.

The following list provides a summary of data quality objectives as presented in the work plan:

- Completeness – 100% of samples submitted were analyzed by the laboratory.
- Accuracy – All surrogate recoveries were within method-specific limits.
- Precision – Collection of field duplicate samples occurred at Building 689. Relative percent differences for duplicate analyses were within the method-specific acceptance criteria approved in the UFP-QAPP except for Acetone results in the parent sample FTB034-VI-B689-W2-09172014 and associated duplicate sample FTB034-VI-B007-S-09172014. These Acetone results have been "J" flagged as estimated concentrations.
- Comparability – All samples were analyzed by the same analytical methods.
- Representativeness – Air sample collection rates were based on recommended times for the type of sample collected. Methylene chloride was detected in the method blank at a concentration greater than the limit of detection (LOD) and less than the limit of quantitation (LOQ). Field samples have been qualified in accordance with the National Functional Guidelines (NFGs). If the field sample concentration is < LOQ and < 10X the method blank, the concentration is qualified < LOQ U. If the concentration is > LOQ but < 10X the method blank, the concentration is qualified as non-detect at the concentration reported. If the concentration is > 10X the method blank, the data is not qualified.

All data reported are useable. No data were rejected. Data qualified due to QC deficiencies are presented in the table in the Data Validation Report in **Appendix C**. A Puerto Rican Certified chemist also reviewed the data package from the laboratory and provided a certification of the data. **Appendix C** includes the Puerto Rican chemist certification of the analytical data.

5 BUILDING-SPECIFIC VISL RISK EVALUATION

The VISL Calculator calculates risk using the recommended approaches in existing guidance and is based on current understanding of the vapor intrusion pathway. Target indoor air concentrations are calculated according to the guidance provided in Risk Assessment Guidance for Superfund (RAGS) (USEPA 2009), which does not support the route-to-route extrapolations that were used in the now outdated screening tables in the USEPA's November 2002 draft vapor intrusion guidance (USEPA 2002).

Site-specific criteria that can be input to the calculator include exposure scenario (either residential or commercial), target risk for carcinogens and target HQ for non-carcinogens, and average in situ groundwater temperature (stabilized temperature measured during well purging prior to groundwater sampling). The VISL Calculator incorporates the latest toxicity values in the Regional Screening Levels (RSL) tables and will be updated as new versions of the RSL tables are released. In the soil gas to indoor air worksheet, the soil gas concentration is entered, which will calculate a predicted indoor air concentration and associated risk.

5.1 Summary of VISL Exposure Intake VI Equations and Input Parameters

The VISL Calculator default exposure and intake parameters were not altered during calculation of building specific LECRs. The maximum detected soil gas concentration at each building was entered into the soil gas to indoor air worksheet. The VISL calculator uses a generic attenuation factor of 0.1.
The table below summarizes the maximum exposure parameters used to calculate VISLs (USEPA 2009).

Inhalation Pathway Exposure Parameters (RME):	Units	Symbol	Value
Exposure Scenario	Commercial		
Averaging time for carcinogens	yrs.	ATc_C	70
Averaging time for non-carcinogens	yrs.	ATnc_C	25
Exposure duration	yrs.	ED_C	25
Exposure frequency	days/yr	EF_C	250
Exposure time	hr/day	ET_C	8

The carcinogenic risk from the vapor intrusion pathway for each chemical entered into the VISL worksheet is calculated using the equation:

$$CR = \frac{Cia \times EF \times ED \times ET \times IUR}{ATc \times 365\ (days/year) \times 24\ (hours/day)}$$

where Cia is the indoor air concentration, IUR is the inhalation unit risk, and ATc, EF, ED, and ET are the default exposure parameters for commercial exposure shown above. Special cases are used for mutagenic chemicals, vinyl chloride, and trichloroethylene. For the equations used for these cases, refer to the VISL section of the VISL Navigation Guide or the USEPA RSL User's Guide (USEPA 2014).

The non-cancer hazard from the vapor intrusion pathway for each chemical entered into the VISL worksheet is calculated using the equation:

$$HQ = \frac{Cia \times EF \times ED \times ET}{RfC \times ATnc \times 365\ (days/year) \times 24\ (hours/day) \times 1{,}000\ (\mu g/mg)}$$

where Cia is the indoor air concentration, RfC is the reference concentration, and ATnc, EF, ED, and ET are the default exposure parameters for commercial exposure as appropriate.

5.2 Building Specific Risk Summary

KEMRON set the soil gas to indoor air worksheet for a commercial exposure scenario, target risk of 10-6, and HQ of 1.0. The VISL worksheet print outs are included in **Appendix D**. **Tables 3A through 3E** display the LECR and HQ individually per VOC and present a cumulative risk total.

Building	Total LECR from VI	Total HQ from VI
Building 539	5.8×10^{-6}	0.031
Building 665	1.9×10^{-6}	0.023
Building 670	2.0×10^{-5}	0.089
Building 676	2.9×10^{-5}	0.16
Building 689	1.1×10^{-5}	0.078

Neither the HI nor the LECR exceeded the respective USEPA threshold levels of 1.0 and risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based solely on evaluation of near slab data adjacent to the buildings at the site, potential cancer risks and non-cancer hazards are within acceptable risk ranges of concern to be protective of human health. It should be noted that the maximum COPC concentration detected at each building was utilized in the LECR and HQ calculations providing an extremely conservative estimation of carcinogenic and non-carcinogenic risk estimates.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

KEMRON conducted a vapor intrusion assessment of the NWBA Groundwater site. The assessment included near slab soil gas sampling at Buildings 539, 665, 670, 676, and 689. The sampling program included the collection of 14 near-slab soil vapor samples and two duplicate soil gas samples. The soil gas concentrations detected in soil gas samples were analyzed with the use of the USEPA VISL calculator. The findings of the assessment are documented below:

- Thirty different VOCs were detected in soil gas samples collected. Of the 30 VOCs detected, four VOCs were detected at concentrations above the VISL Target Exterior Soil Gas Concentrations with a target risk of 1 x 10^{-6} and a HQ of 1.0. The four VOCs detected above VISL screening levels are Benzene, Bromodichloromethane, Chloroform, and Ethylbenzene.
- No groundwater plume related COCs, were detected at concentrations above VISL screening levels in select Buildings evaluated as part of the VI Assessment.
- Building 539, which is the only building sitting above the dissolved TCE plume, reported benzene and chloroform in excess of VISL screening levels. TCE was expected to be a COPC at this location but soil gas concentrations were below the VISL exterior soil gas screening levels utilizing a target risk of 1 x 10^{-6} for commercial exposure scenarios consistent with current and future land uses in the NWBA groundwater site.
- All COPCs, even those that are not TCE groundwater plume related COCs, were evaluated with the VISL calculator. The VISL calculator evaluation calculated the cumulative LECR for each building which ranged from 2.9 x 10^{-5} at Building 676 to 1.9 x 10^{-6} at Building 665. The cumulative HQ's calculated for the five buildings ranged from 0.023 at Building 665 to 0.16 at Building 676. All of the LECR and HQ estimates were within the USEPAs acceptable risk ranges and no adverse effects to human health are anticipated under the current and projected future commercial land use scenarios at the reported maximum soil gas concentrations.

6.2 Recommendations

Based on the VISL analysis of the soil gas data set, the results of the soil gas VI exposure modeling indicate that neither non-cancer hazards nor cancer risks exceed the respective target levels of 1.0 and $1x10^{-5}$. The cumulative LECR and HI estimates across all four COPCs based on the VISL modeling were within acceptable risk tolerances including the analysis of anthropogenic sources COPCs. Therefore, adverse effects to human health under the current and projected future commercial land use are not anticipated at the reported maximum concentrations. In combination, these multiple lines of evidence support elimination of the vapor intrusion pathway from further consideration.

7 REFERENCES

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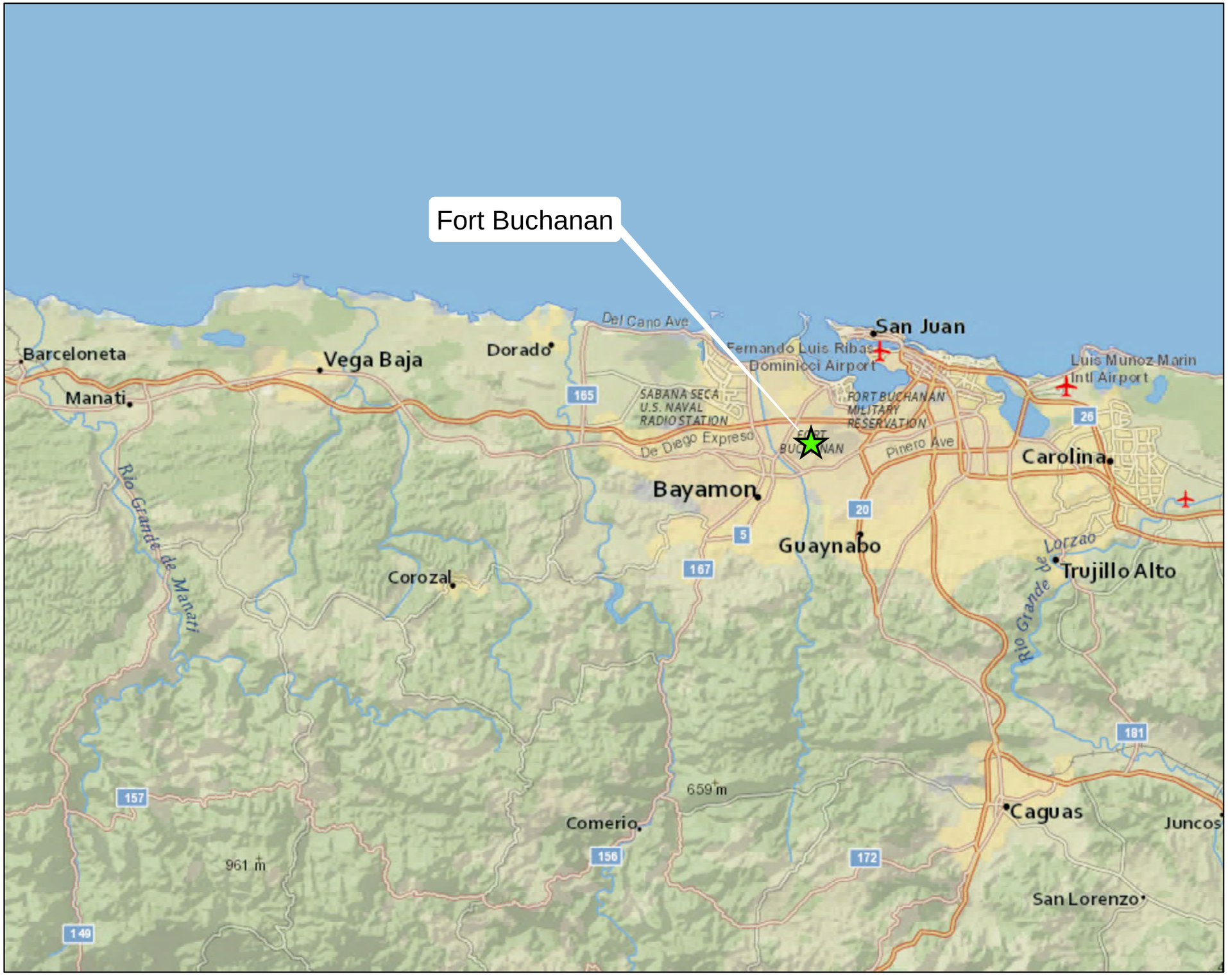
Figures



LEGEND

Site Location

LOCATION MAP

NOTES & SOURCES

Basemap from National Georgraphic 2014

0 2.5 5 10

Kilometers

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 1
Site Location Map

LEGEND

- Site Features
- 2014 TCE Groundwater Plume
- Installation Boundary

LOCATION MAP

NOTES & SOURCES

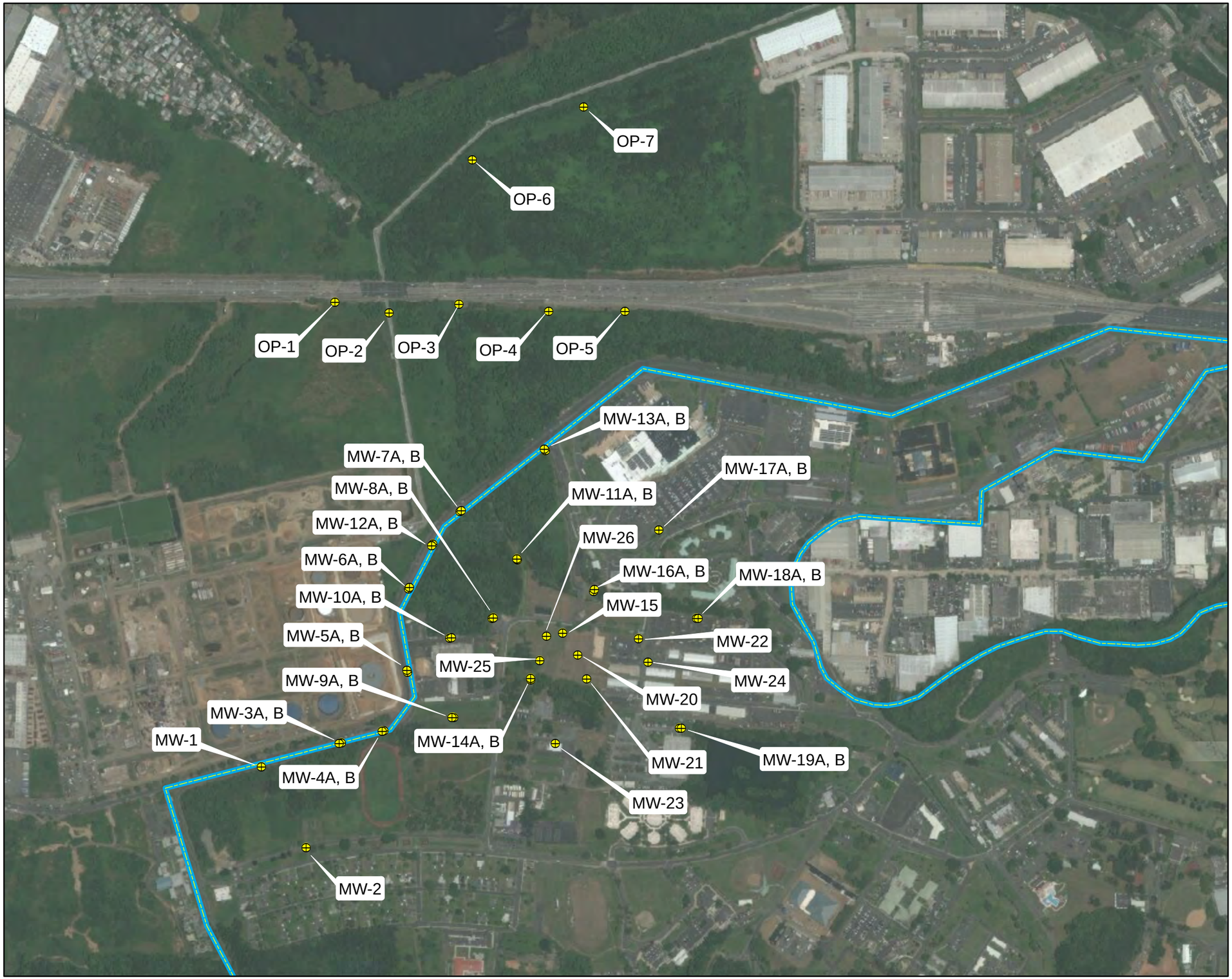
Basemap from ESRI 2013

0 150 300 600

Meters

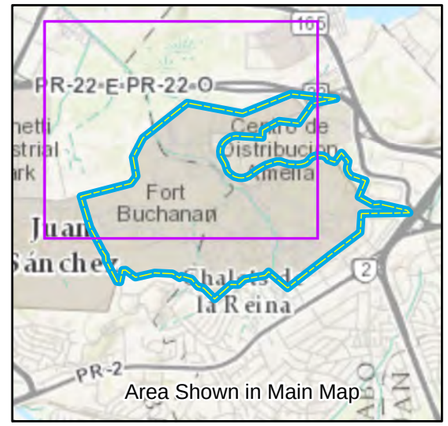
United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 2
Fort Buchanan Site Features Map



LEGEND

- Monitoring Well
- Installation Boundary



NOTES & SOURCES

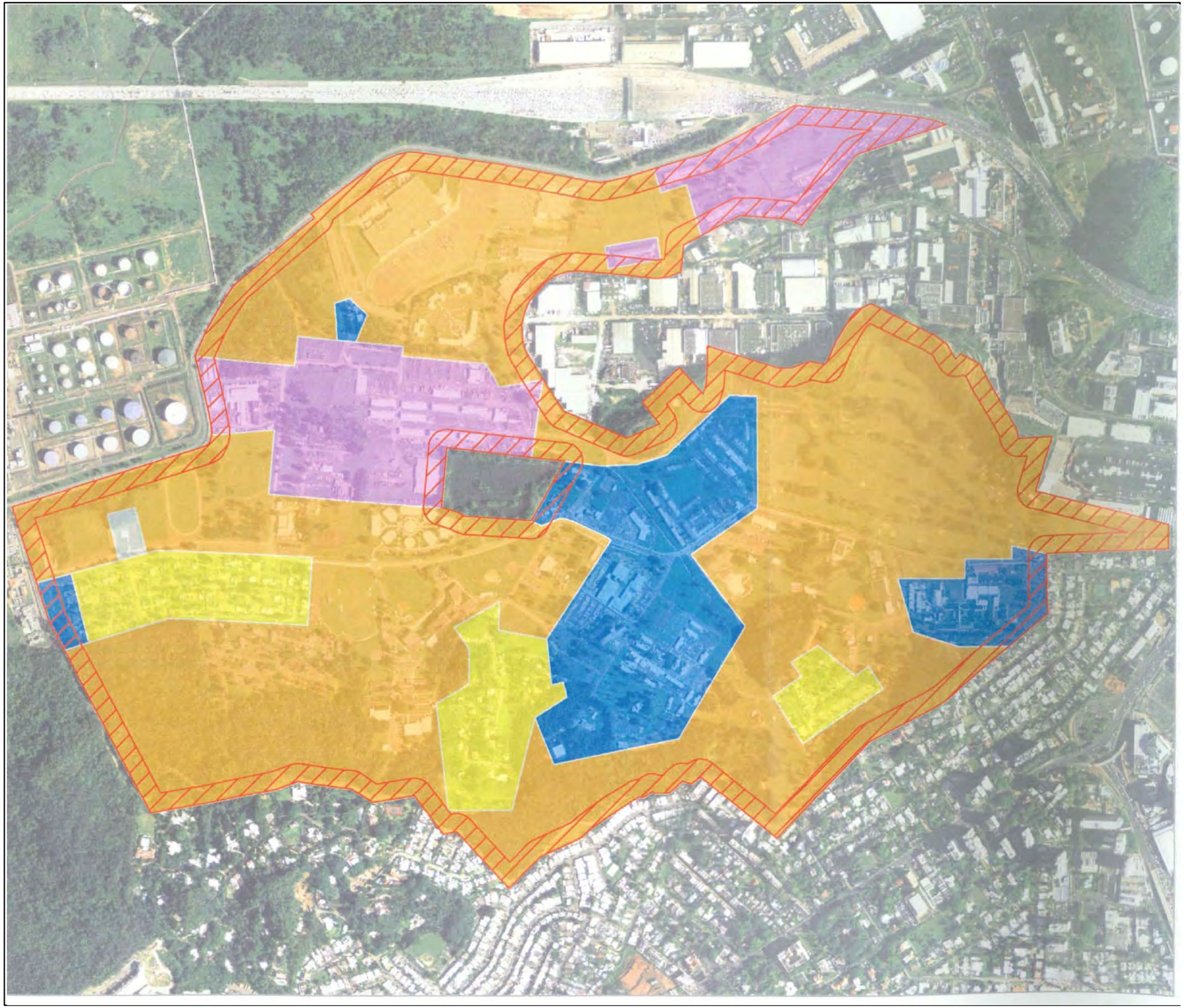
Basemap from ESRI 2013

0 100 200 400

Meters

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 3
Monitoring Well Location Map



LEGEND

- 148-foot ATFP Buffer
- Airfield
- Community
- Industrial
- Professional/ Institutional
- Residential

LOCATION MAP

NOTES & SOURCES

Basemap from ESRI 2013

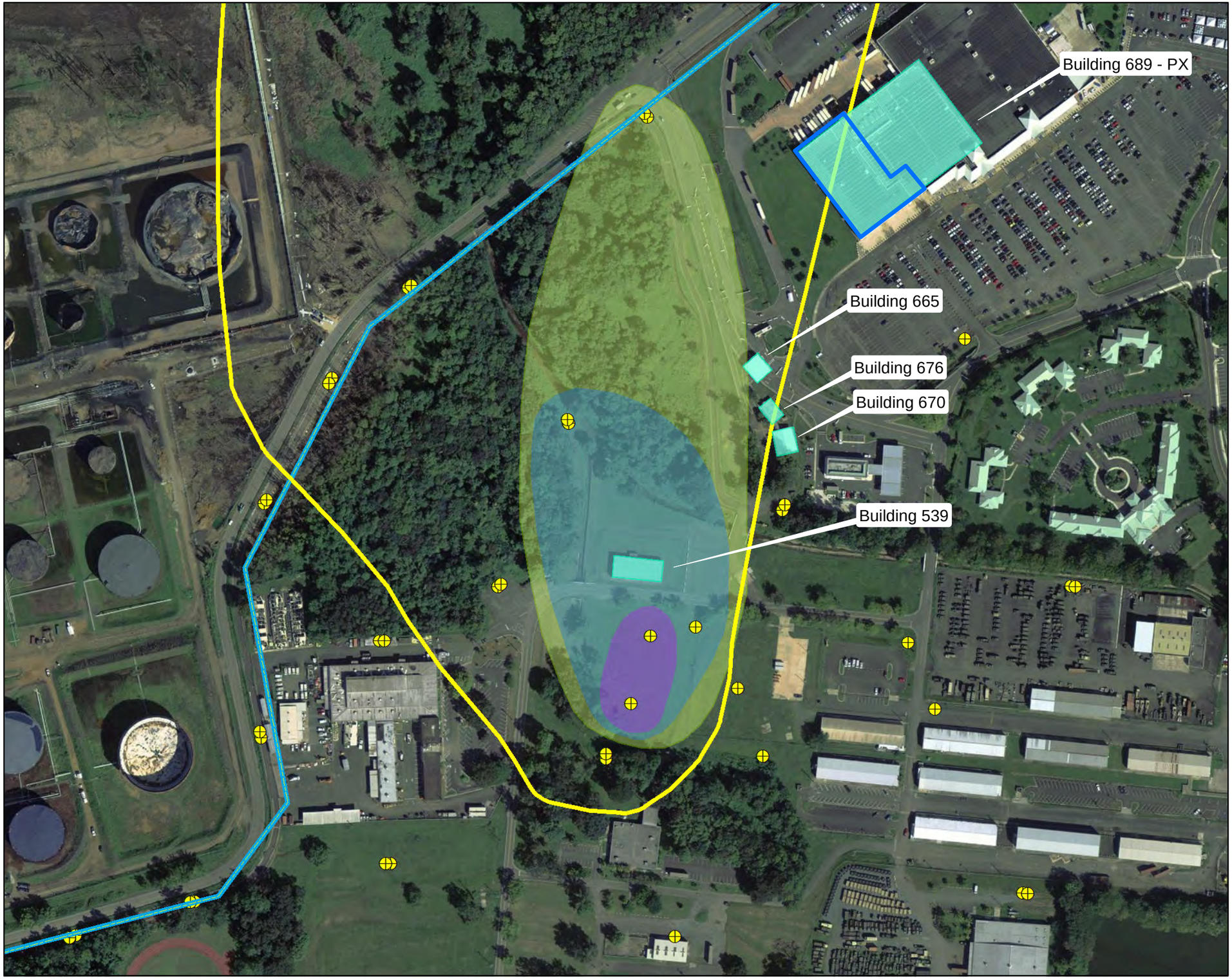
0 300 600

Meters

N W E S

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 4
Fort Buchanan Land Use Control Map

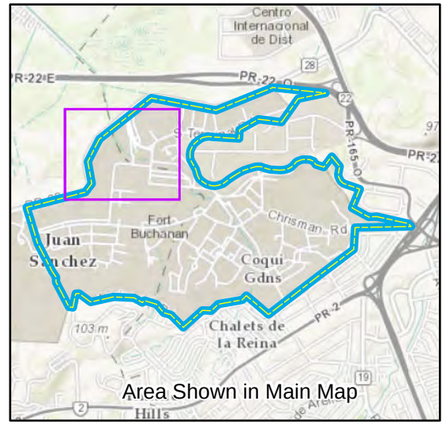


LEGEND

- Installation Boundary
- VI Area of Investigation
- Buildings
- Monitoring Well
- PX Western Portion

TCE Concentrations (2014)

- > 500 ug/L
- 100-500 ug/L
- 5-50 ug/L



NOTES & SOURCES

Basemap from ESRI 2013

VI Area of Investigation based on August 2010 TCE Plume

0 75 150

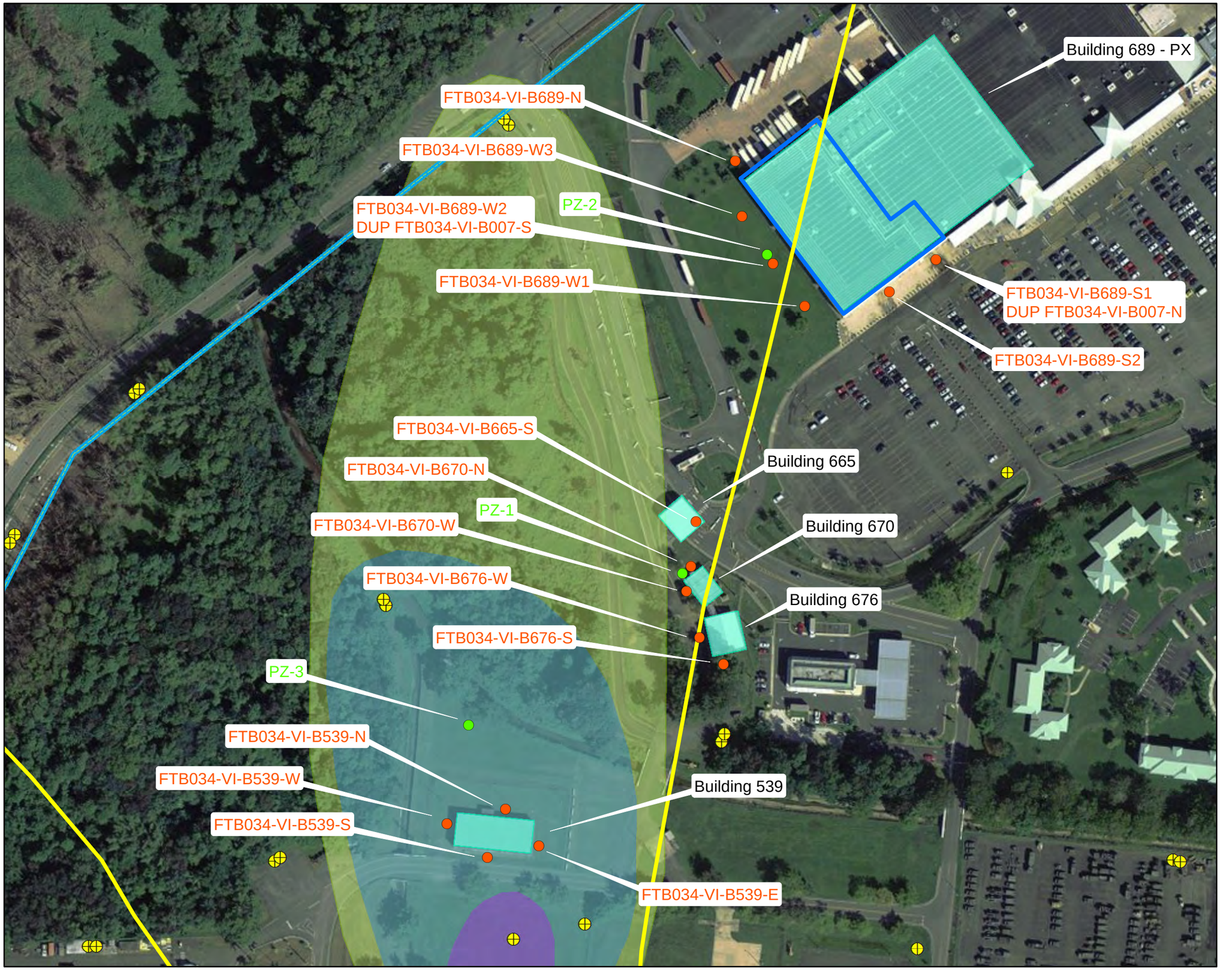
Meters

N W E S

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 5

VI Area of Investigation

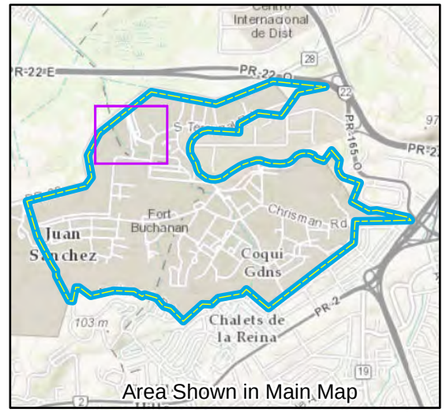


LEGEND

- VI Area of Investigation
- PX Western Portion
- Buildings
- Installation Boundary
- Monitoring Well
- Piezometer
- Near Slab Soil Vapor Implants

TCE Concentrations (2014)

- > 500 ug/L
- 100-500 ug/L
- 5-50 ug/L



NOTES & SOURCES

Basemap from ESRI 2013

VI Area of Investigation based on August 2010 TCE Plume

0 50 100

Meters

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 6
Soil Gas Vapor Implant and
Temporary Piezometer Locations

Analyte	Commercial Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)	Commercial Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)
	µg/m^2	µg/m^3
Benzene	160	16
Bromodichloromethane	33	3.3
Chloroform	53	5.3
Ethylbenzene	490	49

FTB034-VI-B689-N

Analyte	Result (ug/m^3)
Benzene	93

FTB034-VI-B689-W3

FTB034-VI-B689-W2

Analyte	Result (ug/m^3)
Benzene	24

FTB034-VI-B007-S

Analyte	Result (ug/m^3)
Benzene	24

FTB034-VI-B665-S

Analyte	Result (ug/m^3)
Benzene	30

FTB034-VI-B670-N

Analyte	Result (ug/m^3)
Benzene	99
Bromodichloromethane	10
Chloroform	**58**

FTB034-VI-B670-W

Analyte	Result (ug/m^3)
Benzene	26
Chloroform	7.1

FTB034-VI-B676-W

Analyte	Result (ug/m^3)
Benzene	**190**
Ethylbenzene	170

FTB034-VI-B539-W

Analyte	Result (ug/m^3)
Benzene	32

FTB034-VI-B689-S1

Analyte	Result (ug/m^3)
Benzene	73
Bromodichloromethane	3.4
Chloroform	14
Ethylbenzene	52

FTB034-VI-B007-N

Analyte	Result (ug/m^3)
Benzene	72
Bromodichloromethane	3.7
Chloroform	13

FTB034-VI-B689-S2

Analyte	Result (ug/m^3)
Benzene	96
Chloroform	5.8

FTB034-VI-B676-S

Analyte	Result (ug/m^3)
Chloroform	38
Ethylbenzene	480

FTB034-VI-B539-N

Analyte	Result (ug/m^3)
Benzene	21
Chloroform	6.1

FTB034-VI-B539-E

Analyte	Result (ug/m^3)
Benzene	35
Chloroform	19

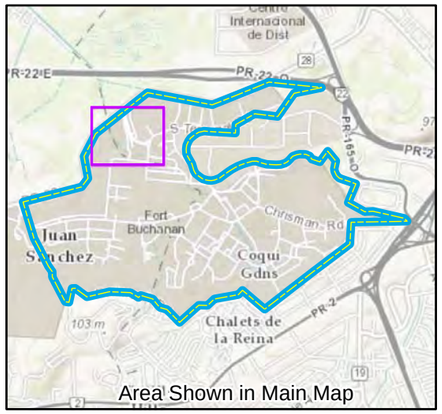
FTB034-VI-B539-S

Analyte	Result (ug/m^3)
Benzene	26

Building 689 - PX
PZ-2
FTB034-VI-B689-W1
Building 665
Building 670
PZ-1
Building 676
PZ-3
Building 539

LEGEND

- VI Area of Investigation
- PX Western Portion
- Buildings
- Installation Boundary
- Monitoring Well
- Piezometer
- Near Slab Soil Vapor Points



Area Shown in Main Map

NOTES & SOURCES

1) Only detections above EPA Target Level 10^{-6} shown.

2) **Bold** detection above EPA Target Level 10^{-5}.

3) All samples collected on 09/17/2014.

4) No Sample Collected at FTB034-VI-B689-W1 due to water in the sample.

5) VI Area of Investigation based on August 2010 TCE Groundwater Plume. The groundwater plume shown is based on July-August 2014 data.

Basemap from ESRI 2013

0 50 100

Meters

United States Army Garrison
Fort Buchanan
Puerto Rico

Figure 7
Soil Gas Laboratory Data
Above VISL Screening Levels

Tables

Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-MW-02 G-03-07-MW-02 1/10/2007	G-03-MW-02 G-03-07-MW-02 6/13/2007	G-03-MW-02, 07-JN-13-DP-3 G-03-07-MW-02 6/13/2007	G-03-MW-03A G-03-07-MW-03A 1/9/2007	G-03-MW-03A G-03-07-MW-03A 6/12/2007	G-03-MW-03A G-03-10-MW-03A 8/17/2010	G-03-MW-03B G-03-07-MW-03B 1/9/2007	G-03-MW-03B G-03-07-MW-03B 6/12/2007	G-03-MW-04A G-03-07-MW-04A 1/9/2007	G-03-MW-04A G-03-07-MW-04A 6/12/2007
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units										
Volatile Organic Compounds														
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	-	-	70	ug/l	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA
trans-1,2-dichloroethene	-	-	100	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	23,000,000	23,000,000	NA	ug/l	b	ND	ND	b	ND	ND	ND	ND	b	ND
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	0.53 J	0.93 J
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	b	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44 J
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5.2	1.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MCL = USEPA Maximum Contaminant Level, June 2011.
NA = Not Analyzed or Not Applicable
ND = Not Detected
b = Data was Rejected by Data Validator
J = Estimated
Bold = Concentration Exceeds MCL
Shading indicates exceedance of screening criteria

Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

				Monitoring Well: Sample ID: Sample Date:	G-03-MW-04A G-03-10-MW-04A 8/18/2010	G-03-MW-04B G-03-07-MW-04B 1/9/2007	G-03-MW-04B G-03-07-MW-04B 6/12/2007	G-03-MW-04B G-03-10-MW-04B 8/18/2010	G-03-MW-05A G-03-07-MW-05A 1/9/2007	G-03-MW-05A G-03-07-MW-05A 6/13/2007	G-03-MW-05A G-03-09-MW-5A 3/11/2009	G-03-MW-05A G-03-10-MW-05A 8/17/2010	G-03-MW-05B G-03-07-MW-05B 1/9/2007	G-03-MW-05B, 07-JA-09-DP G-03-07-MW-05B 1/9/2007
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units										
Volatile Organic Compounds														
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	-	-	70	ug/l	ND	NA	NA	ND	NA	NA	ND	ND	NA	NA
trans-1,2-dichloroethene	-	-	100	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	23,000,000	23,000,000	NA	ug/l	ND	b	ND	ND	b	ND	ND	ND	b	b
Benzene	16	1.6	5	ug/l	ND	0.49 J	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	ND	ND	ND	ND	ND	ND	0.31 J	ND	ND	ND
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	3.9	0.4 J	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5.2	1.2	5	ug/l	ND	ND	ND	ND	4.6	3	**5.5**	3.7	ND	ND
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l	ND	0.58 J	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MCL = USEPA Maximum Contaminant Level, June 2011.
NA = Not Analyzed or Not Applicable
ND = Not Detected
b = Data was Rejected by Data Validator
J = Estimated
Bold = Concentration Exceeds MCL
Shading indicates exceedance of screening criteria

Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-MW-05B G-03-07-MW-05B 6/13/2007	G-03-MW-06A G-03-07-MW-06A 1/9/2007	G-03-MW-06A G-03-07-MW-06A 6/13/2007	G-03-MW-06A G-03-10-MW-06A 8/17/2010	G-03-MW-06B G-03-07-MW-06B 1/9/2007	G-03-MW-06B G-03-07-MW-06B 6/13/2007	G-03-MW-06B G-03-08-MW-06B 1/9/2008	G-03-MW-06B, 08-JA-09-DP2 G-03-08-MW-06B 1/9/2008	G-03-MW-06B G-03-08-MW-6B 5/14/2008
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units									
Volatile Organic Compounds													
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	0.49 J	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	ND	ND	ND	ND	2.8	3.7	3.6	3.2	2.3
Cis-1,2-dichloroethene	-	-	70	ug/l	NA	NA	NA	ND	NA	NA	NA	NA	2.3
trans-1,2-dichloroethene	-	-	100	ug/l	ND	ND	ND	ND	ND	0.39 J	ND	ND	ND
Acetone	23,000,000	23,000,000	NA	ug/l	ND	b	ND	ND	b	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5.2	1.2	5	ug/l	ND	ND	ND	ND	**68.2**	**70.1**	**95**	**87.8 J**	**52.1**
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-MW-06B G-03-09-MW-06B 1/6/2009	G-03-MW-06B, 09-JA-06-DP1 G-03-09-MW-06B 1/6/2009	G-03-MW-06B G-03-09-MW-6B 3/10/2009	G-03-MW-07A G-03-07-MW-07A 1/10/2007	G-03-MW-07A G-07-JA-10-DP G-03-07-MW-07A 1/10/2007	G-03-MW-07A G-03-07-MW-07A 6/13/2007	G-03-MW-07A G-03-08-MW-07A 1/8/2008	G-03-MW-07A G-03-10-MW-07A 8/17/2010	GW-MW-07A FTB034-GW-MW7A-072914 7/29/2014
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units										
Volatile Organic Compounds														
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-dichloroethane	22	2.2	5	ug/l	0.48 J	0.51 J	0.5 J	ND	ND	ND	ND	ND	ND	
1,2-dichloroethene	-	-	NA	ug/l	NA	NA	2.1	ND	ND	ND	ND	ND	ND	
Cis-1,2-dichloroethene	-	-	70	ug/l	3.1	3.2	2.1	NA	NA	NA	NA	ND	ND	
trans-1,2-dichloroethene	-	-	100	ug/l	0.31 J	0.28 J	ND	ND	ND	ND	ND	ND	ND	
Acetone	23,000,000	23,000,000	NA	ug/l	ND	ND	ND	b	b	ND	ND	ND	ND	
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform	8.1	0.81	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethene	58	15	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	5.2	1.2	5	ug/l	**73.8**	**76**	**66.4**	0.95 J	0.92 J	0.69 J	0.82 J	0.61 J	0.779 J	
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well:	G-03-MW-07B	G-03-MW-07B	G-03-MW-07B	G-03-MW-07B	G-03-MW-07B	GW-MW-07B	MW-07B	G-03-MW-07B	G-03-MW-08A
					Sample ID:	G-03-07-MW-07B	G-03-07-MW-07B	G-03-08-MW-07B	G-03-08-MW-7B	G-03-09-MW-07B	FTB034-GW-MW7B-072914	FTB034-GW-MW1C-072914	G-03-07-MW-07B	G-03-07-MW-08A
					Sample Date:	1/10/2007	6/13/2007	1/8/2008	5/14/2008	1/6/2009 &1/7/2009	7/29/2014	7/29/2014	1/10/2007	6/13/2007
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units									
Volatile Organic Compounds													
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	0.57 J	ND	ND	0.29 J	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l	0.86 J	ND	0.59 J	1.1	0.86 J	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	229	184	204	215	NA	ND	ND	17	21
Cis-1,2-dichloroethene	-	-	70	ug/l	a	a	a	183	197	ND	ND	NA	NA
trans-1,2-dichloroethene	-	-	100	ug/l	33.1	21.5	24.3	31.8	35.4	ND	ND	ND	0.35 J
Acetone	23,000,000	23,000,000	NA	ug/l	b	ND	ND	ND	ND	ND	2.66 J	b	ND
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	1.4	0.70 J	ND	ND	0.43 J	ND	ND	ND	ND
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	2.1	0.92 J	0.68 J	0.81 J	0.95 J	ND	ND	ND	ND
Trichloroethene	5.2	1.2	5	ug/l	**162**	**108**	**73.5**	**95.5**	**122**	ND	ND	ND	ND
Vinyl chloride	1.50	0.15	2	ug/l	**15.5**	**7.8**	**13.7**	**18.3**	**25.6**	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well:	MW-08A	MW-08B	MW-08B	G-03-10-MW-11A	GW-MW-11A	G-03-MW-11B	GW-MW-11B
					Sample ID:	FTB034-GM-MW8A-080514	G-03-09-MW-08B	FTB034-GW-MW8B-072414	G-03-MW-11A, 10-AUG-18-DP2	FTB034-GW-MW11A-072914	G-03-09-MW-11B	FTB034-GW-MW11B-073014
					Sample Date:	8/5/2014	3/10/2009	7/24/2014	8/18/2010	7/29/2014	1/6/2009	7/30/2014
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units							
Volatile Organic Compounds											
1,1,2-trichloroethane	6.2	5.2	5	ug/l		ND	ND	ND	0.52 J	0.404 J	1 J	ND
1,1-dichloroethene	200	200	7	ug/l		ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l		ND	ND	ND	ND	0.269 J	ND	ND
1,2-dichloroethene	-	-	NA	ug/l		ND	ND	ND	20.7	ND	NA	ND
Cis-1,2-dichloroethene	-	-	70	ug/l		12.7	ND	ND	20	17.3	14	2
trans-1,2-dichloroethene	-	-	100	ug/l		ND	ND	ND	0.67 J	0.702 J	0.77 J	ND
Acetone	23,000,000	23,000,000	NA	ug/l		4.46 J	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l		0.140 J	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l		ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l		ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l		ND	ND	ND	0.38 J	0.378 J	ND	ND
Chloromethane	260	260	NA	ug/l		ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l		ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l		ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l		ND	ND	ND	**7.5**	**5.54**	**6.7**	0.640 J
Trichloroethene	5.2	1.2	5	ug/l		ND	ND	ND	**179**	**139**	**240**	**30**
Vinyl chloride	1.50	0.15	2	ug/l		ND	ND	ND	ND	0.262 J	ND	ND
Xylenes, Total	100	490	10,000	ug/l		ND	ND	ND	ND	ND	ND	ND

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	MW-12A G-03-10-MW-12A 8/18/2010	GW-MW-12A FTB034-GW-MW12A-072414 7/24/2014	G-03-MW-12B G-03-10-MW-12B 8/18/2010	GW-MW-12B FTB034-GW-MW12B-072414 7/24/2014	G-03-MW-13A G-03-10-MW-13A 8/18/2010	GW-MW-13A FTB034-GW-MW13A-073014 7/30/2014	G-03-MW-13B G-03-10-MW-13B 8/18/2010	GW-MW-13B FTB034-GW-MW13B-073014 7/30/2014
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units									
Volatile Organic Compounds													
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	0.44 J	0.347 J
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	17.3	ND	12.7	ND	ND	ND	51.1	ND
Cis-1,2-dichloroethene	-	-	70	ug/l	16.7	ND	12.7	ND	ND	ND	41.4	56.6
trans-1,2-dichloroethene	-	-	100	ug/l	0.59 J	ND	ND	ND	ND	ND	9.7	3.16
Acetone	23,000,000	23,000,000	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	ND	ND	ND	ND	ND	ND	1.4	0.675 J
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	ND	ND	ND	ND	ND	ND	3.4	0.625 J
Trichloroethene	5.2	1.2	5	ug/l	**45.8**	ND	**35.5**	ND	ND	ND	**154**	**10.4**
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	1.94
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-MW-14A G-03-09-MW-14A 3/10/2009	GW-MW-14A FTB034-GW-MW14A-072814 7/28/2014	MW-14B G-03-8-MW-14B 5/13/2008	GW-MW-14B FTB034-GW-MW14B-072814 7/28/2014	G-03-09-MW-15 G-03-MW-15, 09-JA-07-DP2 1/7/2009 & 1/8/2009	GW-MW-15A FTB034-GW-MW15A-072814 7/28/2014	G-03-MW-16A G-03-09-MW-16A 1/7/2009
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units								
Volatile Organic Compounds												
1,1,2-trichloroethane	6.2	5.2	5	ug/l		ND	ND	ND	ND	1.4	0.924 J	ND
1,1-dichloroethene	200	200	7	ug/l		ND	ND	ND	ND	0.68 J	0.538 J	ND
1,2-dichloroethane	22	2.2	5	ug/l		ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l		ND	ND	ND	ND	NA	ND	NA
Cis-1,2-dichloroethene	-	-	70	ug/l		ND	ND	ND	ND	65.6	58.3	2
trans-1,2-dichloroethene	-	-	100	ug/l		ND	ND	ND	ND	1.3	1.13	ND
Acetone	23,000,000	23,000,000	NA	ug/l		ND	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l		ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l		ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l		ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l		ND	ND	ND	ND	ND	ND	ND
Chloromethane	260	260	NA	ug/l		ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l		ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l		ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l		ND	ND	ND	ND	**24.7**	**14.7**	1.6
Trichloroethene	5.2	1.2	5	ug/l		ND	ND	ND	ND	**331**	**233**	**7.5**
Vinyl chloride	1.50	0.15	2	ug/l		ND	ND	ND	ND	**2.6**	**2.63 J**	ND
Xylenes, Total	100	490	10,000	ug/l		ND	ND	ND	ND	ND	ND	ND

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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	GW-MW-16A FTB034-GW-MW16A-072314 7/23/2014	G-03-MW-16B G-03-09-MW-16B 1/7/2009	GW-MW-16B FTB034-GW-MW16B-072314 7/23/2014	G-03-MW-20 G-03-09-MW-20 1/7/2009	GW-MW-20 FTB034-GW-MW20-072814 7/28/2014	G-03-MW-25 G-03-10-MW-25 8/18/2010	GW-MW-25 FTB034-GW-MW25-073114 7/31/2014	G-03-MW-26 G-03-10-MW-26 8/18/2010	GW-MW-26 FTB034-GW-MW26-073114 7/31/2014
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units										
Volatile Organic Compounds														
1,1,2-trichloroethane	6.2	5.2	5	ug/l		ND	ND	ND	ND	ND	**23.8**	**25.1**	**7.7**	**8.15**
1,1-dichloroethene	200	200	7	ug/l		ND	ND	ND	ND	ND	7.8 J	**9.12**	ND	3.19
1,2-dichloroethane	22	2.2	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l		ND	NA	ND	NA	ND	270	ND	68.7	ND
Cis-1,2-dichloroethene	-	-	70	ug/l		ND	3	ND	ND	ND	**257**	192	65.7	54.4
trans-1,2-dichloroethene	-	-	100	ug/l		ND	ND	ND	ND	ND	13.5	11.5	3 J	2.87
Acetone	23,000,000	23,000,000	NA	ug/l		3.14 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l		ND	ND	ND	ND	ND	ND	0.552 J	ND	ND
Chloromethane	260	260	NA	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l		ND	3.5	ND	ND	ND	**21.9**	**24.1**	**5.4**	4.93
Trichloroethene	5.2	1.2	5	ug/l		ND	**16**	ND	0.62 J	ND	**3430**	**2710**	**1380**	**973**
Vinyl chloride	1.50	0.15	2	ug/l		ND	ND	ND	ND	ND	ND	**5.45**	ND	1.76
Xylenes, Total	100	490	10,000	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND

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Bold = Concentration Exceeds MCL
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Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	GW-MW-26 FTB034-GW-MW2C-073114 7/31/2014	G-03-OP-01 G-03-09-OP-01 1/6/2009 & 1/7/2009	G-03-OP-01 G-03-09-OP-1 3/10/2009	G-03-OP-01, 9-MR-10-DP1 G-03-09-OP-1 3/10/2009	G-03-OP-01 G-03-10-OP-1 8/17/2010	G-03-OP-02 G-03-09-OP-02 1/6/2009 & 1/7/2009	G-03-OP-02 G-03-09-OP-2 3/11/2009	G-03-OP-02, 9-MR-11-DP1 G-03-09-OP-2 3/11/2009	G-03-OP-02 G-03-10-OP-2 8/17/2010	G-03-OP-03 G-03-09-OP-03 1/6/2009	G-03-OP-03 G-03-09-OP-3 3/10/2009	G-03-OP-03 G-03-10-OP-3 8/17/2010
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units													
Volatile Organic Compounds																	
1,1,2-trichloroethane	6.2	5.2	5	ug/l		**8.37**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l		3.17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l		ND	NA	0.32 J	0.31 J	ND	NA	1.5	1.5	1.4	a	6	4.9
Cis-1,2-dichloroethene	-	-	70	ug/l		52.5	0.31 J	0.32 J	0.31 J	ND	1.5	1.5	1.5	1.4	5.6	5.5	4.9
trans-1,2-dichloroethene	-	-	100	ug/l		2.87	ND	ND	ND	ND	ND	ND	ND	ND	0.41 J	0.53 J	ND
Acetone	23,000,000	23,000,000	NA	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l		ND	0.2 J	ND	ND	ND	1.2	0.35 J	0.41 J	ND	1.4	0.66 J	ND
Chloromethane	260	260	NA	ug/l		ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l		**5.01**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31 J	ND
Trichloroethene	5.2	1.2	5	ug/l		**964**	1.5	1.2	1.2	0.75 J	**5.2**	**5.3**	**5.2**	3.7	**22.6**	**20**	**17.3**
Vinyl chloride	1.50	0.15	2	ug/l		1.82	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MCL = USEPA Maximum Contaminant Level, June 2011.
NA = Not Analyzed or Not Applicable
ND = Not Detected
b = Data was Rejected by Data Validator
J = Estimated
Bold = Concentration Exceeds MCL
Shading indicates exceedance of screening criteria

Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-OP-04 G-03-09-OP-04 1/6/2009	G-03-OP-04 G-03-09-OP-4 3/10/2009	G-03-OP-04 G-03-10-OP-4 8/17/2010	GW-OP-4 FTB034-GW-OP4-080514 8/5/2014	G-03-OP-05 G-03-09-OP-05 1/6/2009 & 1/7/2009	G-03-OP-05 G-03-09-OP-5 3/10/2009	G-03-OP-05 G-03-10-OP-5 8/17/2010	G-03-OP-05, 10-AUG-17-DP1 G-03-10-OP-5 8/17/2010	G-03-OP-06 G-03-09-OP-6 3/10/2009	G-03-OP-06 G-03-09-OP-6 4/14/2009	G-03-OP-06 G-03-10-OP-6 8/18/2010	G-03-OP-07 G-03-09-OP-7 3/10/2009
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units													
Volatile Organic Compounds																	
1,1,2-trichloroethane	6.2	5.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	0.64 J	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	0.33 J	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l	a	30.6	41.6	ND	NA	0.52 J	0.63 J	0.7 J	6.3	5	4	ND
Cis-1,2-dichloroethene	-	-	70	ug/l	23.9	26.4	35.6	ND	0.46 J	0.52 J	0.63 J	0.7 J	5.3	4.4	4	ND
trans-1,2-dichloroethene	-	-	100	ug/l	3.7	4.3	6	ND	ND	ND	ND	ND	1	0.54 J	ND	ND
Acetone	23,000,000	23,000,000	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l	ND	ND	ND	ND	0.5 J	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l	5.2	4.9	2.6	ND	7.4	5.3	3.2	3.6	2.2	1.2	ND	ND
Chloromethane	260	260	NA	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l	1.1	1.4	1.4	ND	ND	ND	ND	ND	1.5	1.1	ND	ND
Trichloroethene	5.2	1.2	5	ug/l	**68.2**	**75.5**	**89.6**	ND	**6.4**	**6.8**	**6.6**	**7.2**	**141**	**99.3**	**37**	**ND**
Vinyl chloride	1.50	0.15	2	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MCL = USEPA Maximum Contaminant Level, June 2011.
NA = Not Analyzed or Not Applicable
ND = Not Detected
b = Data was Rejected by Data Validator
J = Estimated
Bold = Concentration Exceeds MCL
Shading indicates exceedance of screening criteria

Table 1. Historical Groundwater Data
Volatile Organic Compounds in Groundwater
Northwest Boundary Area Site (FTB-034)
Fort Buchanan, Puerto Rico

					Monitoring Well: Sample ID: Sample Date:	G-03-OP-07 G-03-09-OP-7 4/14/2009	G-03-CPR-75B G-03-09-CPR-75B 3/11/2009	G-03-CPR-83B1 G-03-09-CPR-83B1 3/11/2009	G-03-CPR-83B2 G-03-09-CPR-83B2 3/11/2009	G-03-CPR-84B2 G-03-09-CPR-84B2 3/11/2009
Compound	VISL Target Groundwater Concentrations (Risk = 1 x 10-5) (HQ=1)	VISL Target Groundwater Concentrations (Risk = 1 x 10-6) (HQ=1)	MCL	Units						
Volatile Organic Compounds										
1,1,2-trichloroethane	6.2	5.2	5	ug/l		ND	ND	ND	ND	ND
1,1-dichloroethene	200	200	7	ug/l		ND	ND	ND	ND	ND
1,2-dichloroethane	22	2.2	5	ug/l		ND	0.45 J	ND	ND	ND
1,2-dichloroethene	-	-	NA	ug/l		9.9	9.7	9.5	16.1	10
Cis-1,2-dichloroethene	-	-	70	ug/l		9	8.1	8	13.7	9
trans-1,2-dichloroethene	-	-	100	ug/l		0.89 J	1.6	1.5	2.4	1
Acetone	23,000,000	23,000,000	NA	ug/l		ND	ND	ND	ND	ND
Benzene	16	1.6	5	ug/l		ND	ND	ND	ND	ND
Bromodichloromethane	8.8	0.88	80	ug/l		ND	ND	ND	ND	ND
Carbon disulfide	1,200	1,200	NA	ug/l		ND	ND	ND	ND	ND
Chloroform	8.1	0.81	80	ug/l		ND	ND	0.41 J	0.27 J	ND
Chloromethane	260	260	NA	ug/l		ND	ND	ND	ND	ND
Ethylbenzene	35	3.5	700	ug/l		ND	ND	ND	ND	ND
Methylene Chloride	4,700	760	5	ug/l		ND	ND	ND	ND	ND
Tetrachloroethene	58	15	5	ug/l		ND	ND	0.63 J	1.4	ND
Trichloroethene	5.2	1.2	5	ug/l		**20.3**	**45.8**	**85.5**	**115**	**20.8**
Vinyl chloride	1.50	0.15	2	ug/l		ND	ND	ND	ND	ND
Xylenes, Total	100	490	10,000	ug/l		ND	ND	ND	ND	ND

Notes:
MCL = USEPA Maximum Contaminant Level, June 2011.
NA = Not Analyzed or Not Applicable
ND = Not Detected
b = Data was Rejected by Data Validator
J = Estimated
Bold = Concentration Exceeds MCL
Shading indicates exceedance of screening criteria

Table 2. Volatile Organic Compounds in Near-Slab Soil Gas
Northwest Boundary Area Site (FTB-034)
All Buildings
Fort Buchanan, Puerto Rico

Analyte	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)	FTB034-VI-B665-S-09172014	FTB034-VI-B676-S-09172014	FTB034-VI-B676-W-09172014	FTB034-VI-B670-W-09172014	FTB034-VI-B670-N-09172014	FTB034-VI-B007-N-09172014	FTB034-VI-B007-S-09172014	FTB034-VI-B539-N-09172014	FTB034-VI-B539-E-09172014	FTB034-VI-B539-S-09172014	FTB034-VI-B539-W-09172014	FTB034-VI-B689-S1-09172014	FTB034-VI-B689-S2-09172014	FTB034-VI-B689-W2-09172014	FTB034-VI-B689-W3-09172014	FTB034-VI-B689-N-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	ND	ND	ND	ND	ND	ND	ND	3.5	ND	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	3.6	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	12	34	34	25	37	72	55	29	26	26	25	88	71	50	40	85	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	ND	ND	4.5	2.3	2.2	2.3	ND	2.6	2.5	ND	ND	2.7	2.8	ND	ND	3.1	No	BSV
1,3,5-Trimethylbenzene	-	-	3.3	23	12	5.2	12	17	11	6.9	19	5.6	5.9	21	16	9	8.1	20	No	NE
1,3-Dichlorobenzene	-	-	3.8	ND	ND	ND	ND	6.8	ND	4.7	ND	ND	ND	6.2	68	5.6	3.3	5.9	No	NE
2-Butanone (MEK)	220,000	220,000	ND	ND	140	ND	6.6	68	ND	6.4	12	ND	ND	65	25	8.4	ND	15	No	BSV
2-Hexanone (MBK)	1,300	1,300	ND	ND	ND	ND	ND	7.1	ND	ND	2.1	ND	ND	5.6	4.2	ND	ND	ND	No	BSV
4-Ethyltoluene	-	-	ND	ND	8.3	4.2	10	18	9.9	6	7	4.2	4.4	22	4.3	8.9	7.3	17	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	ND	ND	9.6	ND	ND	4.7	ND	ND	ND	ND	ND	3.8	2.5	ND	ND	2.3	No	BSV
Acetone	1,400,000	1,400,000	ND	77	540	ND	56	510	32	ND	400	33	34	340	140	93	33	110	No	BSV
Benzene	160	16.0	**30**	ND	**<u>190</u>**	**26**	**99**	**72**	**24**	**21**	**35**	**26**	**32**	**73**	**96**	**24**	15	**93**	Yes	ASV
Bromodichloromethane	33.0	3.30	ND	ND	ND	ND	**10**	**3.7**	ND	ND	ND	ND	ND	**3.4**	ND	ND	ND	ND	Yes	ASV
Bromomethane	220	220	ND	ND	ND	ND	2.4	ND	ND	ND	3.5	ND	ND	ND	ND	ND	ND	ND	No	BSV
Carbon disulfide	31,000	31,000	11	260	480	19	43	110	13	15	19	64	8.2	110	130	16	10	170	No	BSV
Chlorobenzene	2,200	2,200	ND	ND	ND	ND	ND	ND	ND	ND	2.6	2.7	2.6	4.3	4.5	ND	ND	3.4	No	BSV
Chloroform	53.0	5.3	2.9	**38**	3.4	**7.1**	**<u>58</u>**	**13**	2.60	**6.1**	**19**	3.6	4.4	**14**	**5.8**	ND	3.4	ND	Yes	ASV
Chloromethane	3,900	3,900	1.2	ND	2.1	ND	ND	1.3	ND	ND	ND	ND	ND	2.1	ND	1.8	ND	1.2	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	3.3	ND	ND	3.0	2.9	ND	3.10	3.6	3.2	2.9	3.4	ND	3.4	3.2	3.2	ND	No	BSV
Ethylbenzene	490	49	34	**480**	**170**	20	36	40	12	23	19	15	11	**52**	ND	12	10	35	Yes	ASV
m,p-Xylene	4,400	4,400	170	1900	640	64	120	140	52	72	61	55	44	170	ND	48	42	110	No	BSV
Methylene chloride (Dichloromethane)	26,000	12,000	2.8	17	35	3.4	6.8	9	2.9	3.1	3.5	3.4	4.6	11.0	6.2	3.6	3.6	3.6	No	BSV
o-Xylene	4,400	4,400	68	830	330	22	39	49	21	26	22	20	15	63	ND	19	17	44	No	BSV
Styrene	44,000	44,000	2.8	21	15	13	13	15	6.5	14	13	12	8.7	20	ND	6.6	5.7	21	No	BSV
Tetrachloroethene	1,800	470	ND	ND	3.4	ND	3.9	ND	10	ND	ND	ND	ND	ND	4	9.5	ND	ND	No	BSV
Toluene	220,000	220,000	58	100	180	48	85	100	44	59	51	43	44	130	150	40	38	72	No	BSV
trans-1,2-Dichloroethene	-	-	ND	ND	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	No	BSV
Trichloroethene	88.0	30.0	3.2	ND	5.2	ND	6.8	4.6	ND	ND	3	3.6	ND	3.3	7.7	ND	ND	3.3	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	ND	ND	ND	9.2	4.2	ND	ND	3.9	3.8	ND	ND	ND	ND	ND	2.8	ND	No	BSV

Notes:
Bold = exceedance of 1 x 10-6 screening level
Underline = exceedance of 1 x 10-5 screening level
Shading indicates compound retained as COPC
µg/m^3 = microgram per cubic meter
Abbreviations:
BSV = maximum detected concentration below screening value
ASV = above screening value
NE = No screening value established in VISL Calculator

Table 2A. Volatile Organic Compounds in Near-Slab Soil Gas - Building 670
Northwest Boundary Area Site (FTB-034)
Building 670 Visitor's Control Center
Fort Buchanan, Puerto Rico

Analyte	**Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)**	**Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)**	FTB034-VI-B670-W-09172014	FTB034-VI-B670-N-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3	µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	ND	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	ND	ND	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	ND	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	25	37	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	2.3	2.2	No	BSV
1,3,5-Trimethylbenzene	-	-	5.2	12	No	NE
1,3-Dichlorobenzene	-	-	ND	ND	No	NE
2-Butanone (MEK)	220,000	220,000	ND	6.6	No	BSV
2-Hexanone (MBK)	1,300	1,300	ND	ND	No	BSV
4-Ethyltoluene	-	-	4.2	10	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	ND	ND	No	BSV
Acetone	1,400,000	1,400,000	ND	56	No	BSV
Benzene	160	16.0	**26**	**99**	Yes	ASV
Bromodichloromethane	33.0	3.30	ND	**10**	Yes	ASV
Bromomethane	220	220	ND	2.4	No	BSV
Carbon disulfide	31,000	31,000	19	43	No	BSV
Chlorobenzene	2,200	2,200	ND	ND	No	BSV
Chloroform	53.0	5.3	**7.1**	**58**	Yes	ASV
Chloromethane	3,900	3,900	ND	ND	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	3.0	2.9	No	BSV
Ethylbenzene	490	49	20	36	No	BSV
m,p-Xylene	4,400	4,400	64	120	No	BSV
Methylene chloride (Dichloromethane)	26,000	12,000	3.4	6.8	No	BSV
o-Xylene	4,400	4,400	22	39	No	BSV
Styrene	44,000	44,000	13	13	No	BSV
Tetrachloroethene	1,800	470	ND	3.9	No	BSV
Toluene	220,000	220,000	48	85	No	BSV
trans-1,2-Dichloroethene	-	-	ND	ND	No	BSV
Trichloroethene	88.0	30.0	ND	6.8	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	9.2	4.2	No	BSV

Notes:

Bold = exceedance of 1 x 10-6 screening level

Underline = exceedance of 1 x 10-5 screening level

Shading indicates compound retained as COPC

mg/m^3 = microgram per cubic meter

Abbreviations:

BSV = maximum detected concentration below screening value

ASV = above screening value

NE = No screening value established in VISL Calculator

Table 2B. Volatile Organic Compounds in Near-Slab Soil Gas - Building 665
Northwest Boundary Area Site (FTB-034)
Building 665 Main Gate Guard House
Fort Buchanan, Puerto Rico

Analyte	**Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)**	**Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)**	FTB034-VI-B665-S-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	3.6	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	12	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	ND	No	BSV
1,3,5-Trimethylbenzene	-	-	3.3	No	NE
1,3-Dichlorobenzene	-	-	3.8	No	NE
2-Butanone (MEK)	220,000	220,000	ND	No	BSV
2-Hexanone (MBK)	1,300	1,300	ND	No	BSV
4-Ethyltoluene	-	-	ND	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	ND	No	BSV
Acetone	1,400,000	1,400,000	ND	No	BSV
Benzene	160	16.0	**30**	Yes	ASV
Bromodichloromethane	33.0	3.30	ND	No	ASV
Bromomethane	220	220	ND	No	BSV
Carbon disulfide	31,000	31,000	11	No	BSV
Chlorobenzene	2,200	2,200	ND	No	BSV
Chloroform	53.0	5.3	2.9	No	BSV
Chloromethane	3,900	3,900	1.2	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	3.3	No	BSV
Ethylbenzene	490	49	34	No	BSV
m,p-Xylene	4,400	4,400	170	No	BSV
Methylene chloride (Dichloromethane)	26,000	12,000	2.8	No	BSV
o-Xylene	4,400	4,400	68	No	BSV
Styrene	44,000	44,000	2.8	No	BSV
Tetrachloroethene	1,800	470	ND	No	BSV
Toluene	220,000	220,000	58	No	BSV
trans-1,2-Dichloroethene	-	-	ND	No	BSV
Trichloroethene	88.0	30.0	3.2	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	ND	No	BSV

Bold = exceedance of 1 x 10-6 screening level
Underline = exceedance of 1 x 10-5 screening level
Shading indicates compound retained as COPC
mg/m^3 = microgram per cubic meter
Definitions
BSV = maximum detected concentration below screening value
ASV = above screening value
NE = No screening value established in VISL Calculator

Table 2C. Volatile Organic Compounds in Near-Slab Soil Gas - Building 676
Northwest Boundary Area Site (FTB-034)
Building 676 Veterinary Clinic
Fort Buchanan, Puerto Rico

Analyte	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)	FTB034-VI-B676-S-09172014	FTB034-VI-B676-W-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3	µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	ND	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	110	ND	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	11	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	34	34	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	ND	4.5	No	BSV
1,3,5-Trimethylbenzene	-	-	23	12	No	NE
1,3-Dichlorobenzene	-	-	ND	ND	No	NE
2-Butanone (MEK)	220,000	220,000	ND	140	No	BSV
2-Hexanone (MBK)	1,300	1,300	ND	ND	No	BSV
4-Ethyltoluene	-	-	ND	8.3	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	ND	9.6	No	BSV
Acetone	1,400,000	1,400,000	77	540	No	BSV
Benzene	160	16.0	ND	**190**	Yes	ASV
Bromodichloromethane	33.0	3.30	ND	ND	No	BSV
Bromomethane	220	220	ND	ND	No	BSV
Carbon disulfide	31,000	31,000	260	480	No	BSV
Chlorobenzene	2,200	2,200	ND	ND	No	BSV
Chloroform	53.0	5.3	**38**	3.4	Yes	ASV
Chloromethane	3,900	3,900	ND	2.1	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	ND	ND	No	BSV
Ethylbenzene	490	49	**480**	**170**	Yes	ASV
m,p-Xylene	4,400	4,400	1900	640	No	ASV
Methylene chloride (Dichloromethane)	26,000	12,000	17	35	No	BSV
o-Xylene	4,400	4,400	830	330	No	BSV
Styrene	44,000	44,000	21	15	No	BSV
Tetrachloroethene	1,800	470	ND	3.4	No	BSV
Toluene	220,000	220,000	100	180	No	BSV
trans-1,2-Dichloroethene	-	-	ND	2.8	No	BSV
Trichloroethene	88.0	30.0	ND	5.2	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	ND	ND	No	BSV

Notes:
Bold = exceedance of 1 x 10-6 screening level
Underline = exceedance of 1 x 10-5 screening level
Shading indicates compound retained as COPC
µg/m^3 = microgram per cubic meter
Abbreviations:
BSV = maximum detected concentration below screening value
ASV = above screening value
NE = No screening value established in VISL Calculator

Table 2D. Volatile Organic Compounds in Near-Slab Soil Gas - Building 539
Northwest Boundary Area Site (FTB-034)
Building 539 Armory
Fort Buchanan, Puerto Rico

Analyte	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)	FTB034-VI-B539-N-09172014	FTB034-VI-B539-E-09172014	FTB034-VI-B539-S-09172014	FTB034-VI-B539-W-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3	µg/m^3	µg/m^3	µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014	9/17/2014	9/17/2014	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	3.5	ND	ND	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	ND	ND	ND	ND	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	ND	ND	ND	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	29	26	26	25	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	2.6	2.5	ND	ND	No	BSV
1,3,5-Trimethylbenzene	-	-	6.9	19	5.6	5.9	No	NE
1,3-Dichlorobenzene	-	-	4.7	ND	ND	ND	No	NE
2-Butanone (MEK)	220,000	220,000	6.4	12	ND	ND	No	BSV
2-Hexanone (MBK)	1,300	1,300	ND	2.1	ND	ND	No	BSV
4-Ethyltoluene	-	-	6	7	4.2	4.4	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	ND	ND	ND	ND	No	BSV
Acetone	1,400,000	1,400,000	ND	400	33	34	No	BSV
Benzene	160	16.0	**21**	**35**	**26**	**32**	Yes	ASV
Bromodichloromethane	33.0	3.30	ND	ND	ND	ND	No	BSV
Bromomethane	220	220	ND	3.5	ND	ND	No	BSV
Carbon disulfide	31,000	31,000	15	19	64	8.2	No	BSV
Chlorobenzene	2,200	2,200	ND	2.6	2.7	2.6	No	BSV
Chloroform	53.0	5.3	**6.1**	**19**	3.6	4.4	Yes	ASV
Chloromethane	3,900	3,900	ND	ND	ND	ND	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	3.6	3.2	2.9	3.4	No	BSV
Ethylbenzene	490	49	23	19	15	11	No	BSV
m,p-Xylene	4,400	4,400	72	61	55	44	No	BSV
Methylene chloride (Dichloromethane)	26,000	12,000	3.1	3.5	3.4	4.6	No	BSV
o-Xylene	4,400	4,400	26	22	20	15	No	BSV
Styrene	44,000	44,000	14	13	12	8.7	No	BSV
Tetrachloroethene	1,800	470	ND	ND	ND	ND	No	BSV
Toluene	220,000	220,000	59	51	43	44	No	BSV
trans-1,2-Dichloroethene	-	-	ND	ND	ND	ND	No	BSV
Trichloroethene	88.0	30.0	ND	3	3.6	ND	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	3.9	3.8	ND	ND	No	BSV

Notes:

Bold = exceedance of 1 x 10-6 screening level

Underline = exceedance of 1 x 10-5 screening level

Shading indicates compound retained as COPC

µg/m^3 = microgram per cubic meter

Abbreviations:

BSV = maximum detected concentration below screening value

ASV = above screening value

NE = No screening value established in VISL Calculator

Table 2E. Volatile Organic Compounds in Near-Slab Soil Gas - Building 689
Northwest Boundary Area Site (FTB-034)
Building 689 Post Exchange (PX)
Fort Buchanan, Puerto Rico

Analyte	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-5) (HQ=1)	Commercial VISL Target Sub-Slab and Exterior Soil Gas Concentration (Risk = 1 x 10-6) (HQ=1)	FTB034-VI-B007-N-09172014	FTB034-VI-B007-S-09172014	FTB034-VI-B689-S1-09172014	FTB034-VI-B689-S2-09172014	FTB034-VI-B689-W2-09172014	FTB034-VI-B689-W3-09172014	FTB034-VI-B689-N-09172014	Retained as COPC?	Rationale for Chemical Deletion or Selection
			µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3		
Date Collected	µg/m^3	µg/m^3	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014	9/17/2014		
1,1,1,2-Tetrachloroethane	170	17.0	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,1,1-Trichloroethane	220,000	220,000	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,1-Difluoroethane (LLC)	1,800,000	1,800,000	ND	ND	ND	ND	ND	ND	ND	No	BSV
1,2,4-Trimethylbenzene	310.0	310.0	72	55	88	71	50	40	85	No	BSV
1,2-Dichloroethane (DCE)	47	4.7	2.3	ND	2.7	2.8	ND	ND	3.1	No	BSV
1,3,5-Trimethylbenzene	-	-	17	11	21	16	9	8.1	20	No	NE
1,3-Dichlorobenzene	-	-	6.8	ND	6.2	68	5.6	3.3	5.9	No	NE
2-Butanone (MEK)	220,000	220,000	68	ND	65	25	8.4	ND	15	No	BSV
2-Hexanone (MBK)	1,300	1,300	7.1	ND	5.6	4.2	ND	ND	ND	No	BSV
4-Ethyltoluene	-	-	18	9.9	22	4.3	8.9	7.3	17	No	NE
4-Methyl-2-pentanone (MIBK)	130,000	130,000	4.7	ND	3.8	2.5	ND	ND	2.3	No	BSV
Acetone	1,400,000	1,400,000	510	32	340	140	93	33	110	No	BSV
Benzene	160	16.0	**72**	**24**	**73**	**96**	**24**	15	**93**	Yes	ASV
Bromodichloromethane	33.0	3.3	**3.7**	ND	**3.4**	ND	ND	ND	ND	Yes	ASV
Bromomethane	220	220	ND	ND	ND	ND	ND	ND	ND	No	BSV
Carbon disulfide	31,000	31,000	110	13	110	130	16	10	170	No	BSV
Chlorobenzene	2,200	2,200	ND	ND	4.3	4.5	ND	ND	3.4	No	BSV
Chloroform	53.0	5.3	**13**	2.60	**14**	**5.8**	ND	3.4	ND	Yes	ASV
Chloromethane	3,900	3,900	1.3	ND	2.1	ND	1.8	ND	1.2	No	BSV
Dichlorodifluoromethane (F12)	4,400	4,400	ND	3.10	ND	3.4	3.2	3.2	ND	No	BSV
Ethylbenzene	490	49	40	12	**52**	ND	12	10	35	Yes	ASV
m,p-Xylene	4,400	4,400	140	52	170	ND	48	42	110	No	BSV
Methylene chloride (Dichloromethane)	26,000	12,000	9	2.9	11.0	6.2	3.6	3.6	3.6	No	BSV
o-Xylene	4,400	4,400	49	21	63	ND	19	17	44	No	BSV
Styrene	44,000	44,000	15	6.5	20	ND	6.6	5.7	21	No	BSV
Tetrachloroethene	1,800	470	ND	10	ND	4	9.5	ND	ND	No	BSV
Toluene	220,000	220,000	100	44	130	150	40	38	72	No	BSV
trans-1,2-Dichloroethene	-	-	ND	ND	ND	ND	ND	ND	ND	No	BSV
Trichloroethene	88.0	30.0	4.6	ND	3.3	7.7	ND	ND	3.3	No	BSV
Trichlorofluoromethane (F11)	31,000	31,000	ND	ND	ND	ND	ND	2.8	ND	No	BSV

Notes:
Bold = exceedance of 1 x 10-6 screening level
Underline = exceedance of 1 x 10-5 screening level
Shading indicates compound retained as COPC
µg/m^3 = microgram per cubic meter
Abbreviations:
BSV = maximum detected concentration below screening value
ASV = above screening value
NE = No screening value established in VISL Calculator

Table 3A. Near-Slab Soil Gas VISL Risk Assessment Summary - Building 670
Commercial Exposure Scenario
Northwest Boundary Area Site (FTB-034)
Building 670 Visitor's Control Center
Fort Buchanan, Puerto Rico

COPC	Maximum Concentration ($\mu g/m^3$)	Sample Location	Sample Depth (ftbgs)	LECR[a]	HQ[a]
Benzene	99	Building 670 (Visitor's Center) North Side	2.5	6.3E-06	7.5E-02
Bromodichloromethane	10	Building 670 (Visitor's Center) North Side	2.5	3.0E-06	No RfC[d]
Chloroform	58	Building 670 (Visitor's Center) North Side	2.5	1.1E-05	1.4E-02
				Total LECR[b]	**Total HI[c]**
				2.0E-05	8.9E-02

Abbreviations:

COPC: chemical of potential concern

$\mu g/m^3$: micrograms per cubic meter

fbgs: feet below ground surface

LECR: lifetime excess cancer risk

HQ: hazard quotient

HI: hazard index

Footnotes:

[a]Calculated using VISL Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs.

[b]Pathway-specific total LECR = sum of chemical-specific LECRs.

[c]Pathway-specific HI = sum of chemical-specific HQs.

[d]No Reference Concentration available for calculation

Table 3B. Near-Slab Soil Gas VISL Risk Assessment Summary - Building 665
Commercial Exposure Scenario
Northwest Boundary Area Site (FTB-034)
Building 665 Main Gate Guard House
Fort Buchanan, Puerto Rico

COPC	Maximum Concentration ($\mu g/m^3$)	Sample Location	Sample Depth (ftbgs)	LECR[a]	HQ[a]
Benzene	30	Building 665 Main Gate Guard House South Side	2.5	1.9E-06	2.3E-02
				Total LECR[b]	**Total HI[c]**
				1.9E-06	2.3E-02

Abbreviations:

COPC: chemical of potential concern

$\mu g/m^3$: micrograms per cubic meter

fbgs: feet below ground surface

LECR: lifetime excess cancer risk

HQ: hazard quotient

HI: hazard index

Footnotes:

[a]Calculated using VISL Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs.

[b]Pathway-specific total LECR = sum of chemical-specific LECRs.

[c]Pathway-specific HI = sum of chemical-specific HQs.

Table 3C. Near-Slab Soil Gas VISL Risk Assessment Summary - Building 676
Commercial Exposure Scenario
Northwest Boundary Area Site (FTB-034)
Building 676 Veterinary Clinic
Fort Buchanan, Puerto Rico

COPC	Maximum Concentration ($\mu g/m^3$)	Sample Location	Sample Depth (ftbgs)	LECR[a]	HQ[a]
Benzene	190	Building 676 (Vet Clinic) West Side	2.5	1.2E-05	1.4E-01
Chloroform	38	Building 676 (Vet Clinic) South Side	2.5	7.1E-06	8.9E-03
Ethylbenzene	480	Building 676 (Vet Clinic) South Side	2.5	9.8E-06	1.1E-02
				Total LECR[b]	**Total HI[c]**
				2.9E-05	1.6E-01

Abbreviations:

COPC: chemical of potential concern

$\mu g/m^3$: micrograms per cubic meter

fbgs: feet below ground surface

LECR: lifetime excess cancer risk

HQ: hazard quotient

HI: hazard index

Footnotes:

[a]Calculated using VISL Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs.

[b]Pathway-specific total LECR = sum of chemical-specific LECRs.

[c]Pathway-specific HI = sum of chemical-specific HQs.

[d]No Inhalation Unit Risk available for calculation

Table 3D. Near-Slab Soil Gas VISL Risk Assessment Summary - Building 539
Commercial Exposure Scenario
Northwest Boundary Area Site (FTB-034)
Building 539 Armory
Fort Buchanan, Puerto Rico

COPC	Maximum Concentration ($\mu g/m^3$)	Sample Location	Sample Depth (ftbgs)	LECR[a]	HQ[a]
Benzene	35	Building 539 (Armory) East Side	2.5	2.2E-06	2.7E-02
Chloroform	19	Building 539 (Armory) East Side	2.5	3.6E-06	4.4E-03
				Total LECR[b]	**Total HI[c]**
				5.8E-06	3.1E-02

Abbreviations:

COPC: chemical of potential concern

$\mu g/m^3$: micrograms per cubic meter

fbgs: feet below ground surface

LECR: lifetime excess cancer risk

HQ: hazard quotient

HI: hazard index

Footnotes:

[a]Calculated using VISL Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs.

[b]Pathway-specific total LECR = sum of chemical-specific LECRs.

[c]Pathway-specific HI = sum of chemical-specific HQs.

Table 3E. Near-Slab Soil Gas VISL Risk Assessment Summary - Building 689
Commercial Exposure Scenario
Northwest Boundary Area Site (FTB-034)
Building 689 Post Exchange (PX)
Fort Buchanan, Puerto Rico

COPC	Maximum Concentration ($\mu g/m^3$)	Sample Location	Sample Depth (ftbgs)	LECR[a]	HQ[a]
Benzene	96	Building 689 (PX) South Side	5.0	6.1E-06	7.3E-02
Bromodichloromethane	3.7	Building 689 (PX) North Side	5.0	1.1E-06	No RfC[e]
Chloroform	14	Building 689 (PX) South Side	5.0	2.6E-06	3.3E-03
Ethylbenzene	52	Building 689 (PX) South Side	5.0	1.1E-06	1.2E-03
				Total LECR[b]	**Total HI[c]**
				1.1E-05	7.8E-02

Abbreviations:

COPC: chemical of potential concern

$\mu g/m^3$: micrograms per cubic meter

fbgs: feet below ground surface

LECR: lifetime excess cancer risk

HQ: hazard quotient

HI: hazard index

Footnotes:

[a]Calculated using VISL Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs.

[b]Pathway-specific total LECR = sum of chemical-specific LECRs.

[c]Pathway-specific HI = sum of chemical-specific HQs.

[d]No Inhalation Unit Risk available for calculation

[e]No Reference Concentration available for calculation

Appendix A
Soil Gas Sampling Checklists

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client: Kemron

Sample ID: FTB034-VI-B676-W-09172014 Time: 10:35

Permanent Implant: _____ DPT Rods: _____ Temporary Implant: x

Borehole Diameter: _____ 1.25" x 1.5" _____ 1.75"

Tubing Type: x Nylaflow _____ Teflon _____ Other

Leak Test: x Active _____ Passive _____ Compound HE

Tubing Length: 3' 6"

Initial 88 %
Final 72 %
Implant 2450 ppm

Purge Volume: 180 1 or 3 purge volume

Sample flow rate: <200

Maximum vacuum pressure during purging: <5 H20 or Hg

Sample collection method: x Summa Can _____ Tedlar Bag _____ Syringe

Summa Can Beginning Vacuum: 26 H20 or Hg

Summa Can Ending Vacuum: 0 H20 or Hg

HP Regulator #: 32

HP Summa Can #: 214

Construction Details (if applicable)

Total Depth (boring): 2' 6"
Implant Depth: 2' 6"
Sand Depth: 2'
Bentonite: Surface
Concrete: None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B676-S-09172014			Time:	10:05		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	65	%
					Final	48	%
Purge Volume	180	1 or 3 purge volume			Implant	2100	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	30					H20 or Hg	
Summa Can Ending Vacuum	3					H20 or Hg	
HP Regulator #	124						
HP Summa Can #	293						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B665-S-09172014			Time:	9:40		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	80	%
					Final	65	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	29					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	162						
HP Summa Can #	368						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client: Kemron

Sample ID: FTB034-VI-B670-W-09172014 Time: 10:50

Permanent Implant: _____ DPT Rods: _____ Temporary Implant: x

Borehole Diameter: _____ 1.25" x 1.5" _____ 1.75"

Tubing Type: x Nylaflow _____ Teflon _____ Other

Leak Test: x Active _____ Passive _____ Compound HE

Tubing Length: 3' 6"

Initial 92 %
Final 82 %
Implant 0 ppm

Purge Volume: 180 1 or 3 purge volume

Sample flow rate: <200

Maximum vacuum pressure during purging: <5 H20 or Hg

Sample collection method: x Summa Can _____ Tedlar Bag _____ Syringe

Summa Can Beginning Vacuum: 30 H20 or Hg

Summa Can Ending Vacuum: 0 H20 or Hg

HP Regulator #: 159

HP Summa Can #: 207

Construction Details (if applicable)

Total Depth (boring): 2' 6"
Implant Depth: 2' 6"
Sand Depth: 2'
Bentonite: Surface
Concrete: None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B670-N-09172014			Time:	11:10		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	81	%
					Final	68	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5			H20 or Hg	
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	28					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	177						
HP Summa Can #	355						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client: Kemron

Sample ID: FTB034-VI-B539-W-09172014 Time:

Permanent Implant: _____ DPT Rods: _____ Temporary Implant: x

Borehole Diameter: _____ 1.25" x 1.5" _____ 1.75"

Tubing Type: x Nylaflow _____ Teflon _____ Other

Leak Test: x Active _____ Passive _____ Compound HE

Tubing Length: 3' 6"

Initial 84 %
Final 68 %
Implant 0 ppm

Purge Volume: 180 1 or 3 purge volume

Sample flow rate: <200

Maximum vacuum pressure during purging: <5 H20 or Hg

Sample collection method: x Summa Can _____ Tedlar Bag _____ Syringe

Summa Can Beginning Vacuum: 29 H20 or Hg

Summa Can Ending Vacuum: 0 H20 or Hg

HP Regulator #: 156

HP Summa Can #: 362

Construction Details (if applicable)

Total Depth (boring): 2' 6"
Implant Depth: 2' 6"
Sand Depth: 2'
Bentonite: Surface
Concrete: None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B539-N-09172014			Time:	12:20		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	88	%
					Final	72	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	29					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	89						
HP Summa Can #	461						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B539-S-09172014			Time:	13:00		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	84	%
					Final	68	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	30+					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	133						
HP Summa Can #	255						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B539-E-09172014			Time:	12:40		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	3' 6"				Initial	88	%
					Final	72	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5			H20 or Hg	
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	27					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	24						
HP Summa Can #	49						

Construction Details (if applicable)

Total Depth (boring)	2' 6"
Implant Depth	2' 6"
Sand Depth	2'
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B689-N-09172014			Time:	15:30		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc	HE
Tubing Length	6'				Initial	79	%
					Final	65	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	29					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	41						
HP Summa Can #	137						

Construction Details (if applicable)

Total Depth (boring)	5.0'
Implant Depth	5.0'
Sand Depth	4' 6"
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron						
Sample ID	FTB034-VI-B689-W1-09172014			Time:	**Water in implant - No Sample**		
Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compounc HE	
Tubing Length	6'				Initial	%	
					Final	%	
Purge Volume	180	1 or 3 purge volume			Implant	ppm	
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5			H20 or Hg	
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	28					H20 or Hg	
Summa Can Ending Vacuum	27					H20 or Hg	
HP Regulator #	89						
HP Summa Can #	221						

Construction Details (if applicable)

Total Depth (boring)	5.0'
Implant Depth	5.0'
Sand Depth	4' 6"
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron		
Sample ID	FTB034-VI-B689-W2-09172014	Time:	14:50
	FTB034-VI-B007S-09172014 (Dup) - Collected		16:00

Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compound	HE
Tubing Length	6'				Initial	81	%
					Final	68	%
Purge Volume	180	1 or 3 purge volume			Implant	100	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	30+					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	79						
HP Summa Can #	208						

Construction Details (if applicable)

Total Depth (boring)	5.0'
Implant Depth	5.0'
Sand Depth	4' 6"
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client: Kemron

Sample ID: FTB034-VI-B689-W3-09172014 Time: 15:05

Permanent Implant: _____ DPT Rods: _____ Temporary Implant: x

Borehole Diameter: _____ 1.25" x 1.5" _____ 1.75"

Tubing Type: x Nylaflow _____ Teflon _____ Other

Leak Test: x Active _____ Passive _____ Compound HE

Tubing Length: 6'

Initial 78 %
Final 65 %
Implant 100 ppm

Purge Volume: 180 1 or 3 purge volume

Sample flow rate: <200

Maximum vacuum pressure during purging: <5 H20 or Hg

Sample collection method: x Summa Can _____ Tedlar Bag _____ Syringe

Summa Can Beginning Vacuum: 29 H20 or Hg

Summa Can Ending Vacuum: 0 H20 or Hg

HP Regulator #: 20

HP Summa Can #: 105

Construction Details (if applicable)

Total Depth (boring): 5.0'
Implant Depth: 5.0'
Sand Depth: 4' 6"
Bentonite: Surface
Concrete: None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client	Kemron		
Sample ID	FTB034-VI-B689-S1-09172014	Time:	13:40
	FTB034-VI-B007-N-09172014 (Dup) - Collected		15:00

Permanent Implant		DPT Rods		Temporary Implant	x		
Borehole Diameter		1.25"	x	1.5"		1.75"	
Tubing Type	x	Nylaflow		Teflon		Other	
Leak Test	x	Active		Passive		Compound	HE
Tubing Length	6'				Initial	82	%
					Final	71	%
Purge Volume	180	1 or 3 purge volume			Implant	0	ppm
Sample flow rate	<200						
Maximum vacuum pressure during purging			<5				H20 or Hg
Sample collection method	x	Summa Can		Tedlar Bag		Syringe	
Summa Can Beginning Vacuum	27					H20 or Hg	
Summa Can Ending Vacuum	0					H20 or Hg	
HP Regulator #	56						
HP Summa Can #	4						

Construction Details (if applicable)

Total Depth (boring)	5.0'
Implant Depth	5.0'
Sand Depth	4' 6"
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Atlas Geo-Sampling
Soil Vapor Sampling Checklist

Client: Kemron

Sample ID: FTB034-VI-B689-S2-09172014 Time: 14:00

Permanent Implant: _____ DPT Rods: _____ Temporary Implant: x

Borehole Diameter: _____ 1.25" x 1.5" _____ 1.75"

Tubing Type: x Nylaflow _____ Teflon _____ Other

Leak Test: x Active _____ Passive _____ Compound HE

Tubing Length: 6'

Initial 77 %
Final 67 %

Purge Volume: 180 1 or 3 purge volume

Implant 0 ppm

Sample flow rate: <200

Maximum vacuum pressure during purging: <5 H20 or Hg

Sample collection method: x Summa Can _____ Tedlar Bag _____ Syringe

Summa Can Beginning Vacuum: 28 H20 or Hg

Summa Can Ending Vacuum: **16** H20 or Hg

HP Regulator #: 199

HP Summa Can #: 253

Construction Details (if applicable)

Total Depth (boring)	5.0'
Implant Depth	5.0'
Sand Depth	4' 6"
Bentonite	Surface
Concrete	None

* Make sure no ambient air is allowed to enter the sample tubing between purging and sampling

Appendix B
Laboratory Analytical Report

Mobile
Geochemistry Inc.

06 October 2014

Mr. Jim Fineis
Atlas Geo-Sampling Company
120 Nottaway Lane
Alpharetta, GA 30009

RE: AG092214-14
Client Project: SH4906.011 / Puerto Rico

Dear Mr. Jim Fineis:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 22-Sep-14 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody

Unless otherwise noted, all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. All field samples collected by H&P personnel were performed in compliance with our Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

Janis Villarreal

Janis Villarreal
Laboratory Director

H&P Mobile Geochemistry, Inc. operates under CA Environmental Lab Accreditation Program Numbers 2579, 2740, 2741, 2742, 2743, 2745 and 2754. National Environmental Laboratory Accreditation Conference (NELAC) Standards Lab #11845

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760-804-9678 Phone
760-804-9159 Fax

Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sampled	Prepared	Analyzed
FTB034-VI-B665-S-09172014	E409104-01	Vapor	17-Sep-14 09:40	02-Oct-14 16:12	02-Oct-14 16:48
FTB034-VI-B676-S-09172014	E409104-02	Vapor	17-Sep-14 10:05	02-Oct-14 16:12	03-Oct-14 10:08
FTB034-VI-B676-W-09172014	E409104-03	Vapor	17-Sep-14 10:36	02-Oct-14 16:12	02-Oct-14 17:56
FTB034-VI-B670-W-09172014	E409104-04	Vapor	17-Sep-14 10:50	02-Oct-14 16:12	02-Oct-14 18:32
FTB034-VI-B670-N-09172014	E409104-05	Vapor	17-Sep-14 11:10	02-Oct-14 16:12	02-Oct-14 19:09
FTB034-VI-B007-N-09172014	E409104-06	Vapor	17-Sep-14 15:00	02-Oct-14 16:12	02-Oct-14 19:47
FTB034-VI-B007-S-09172014	E409104-07	Vapor	17-Sep-14 16:00	02-Oct-14 16:12	02-Oct-14 20:25
FTB034-VI-B539-N-09172014	E409104-08	Vapor	17-Sep-14 12:20	02-Oct-14 16:12	02-Oct-14 21:02
FTB034-VI-B539-E-09172014	E409104-09	Vapor	17-Sep-14 12:40	02-Oct-14 16:12	02-Oct-14 21:40
FTB034-VI-B539-S-09172014	E409104-10	Vapor	17-Sep-14 13:00	02-Oct-14 16:12	02-Oct-14 22:18
FTB034-VI-B539-W-09172014	E409104-11	Vapor	17-Sep-14 13:15	02-Oct-14 16:12	02-Oct-14 22:55
FTB034-VI-B689-S1-09172014	E409104-12	Vapor	17-Sep-14 13:40	02-Oct-14 16:12	02-Oct-14 23:33
FTB034-VI-B689-S2-09172014	E409104-13	Vapor	17-Sep-14 14:00	02-Oct-14 16:12	03-Oct-14 00:12
FTB034-VI-B689-W2-09172014	E409104-14	Vapor	17-Sep-14 14:50	02-Oct-14 16:12	03-Oct-14 00:50
FTB034-VI-B689-W3-09172014	E409104-15	Vapor	17-Sep-14 15:05	02-Oct-14 16:12	03-Oct-14 01:28
FTB034-VI-B689-N-09172014	E409104-16	Vapor	17-Sep-14 15:30	02-Oct-14 16:12	03-Oct-14 02:06

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B665-S-09172014 (E409104-01) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.3**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	**1.2**	1.0	2.1	"	"	"	"	"	"	J
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	ND	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**2.8**	1.8	3.5	"	"	"	"	"	"	B-03, J
Carbon disulfide	**11**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	ND	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**2.9**	2.5	4.9	"	"	"	"	"	"	J
1,1,1-Trichloroethane	**3.6**	2.8	5.5	"	"	"	"	"	"	J
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**30**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**3.2**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**58**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	

H&P Mobile
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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B665-S-09172014 (E409104-01) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Ethylbenzene	**34**	2.2	4.4	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
m,p-Xylene	**170**	2.2	8.8	"	"	"	"	"	"	
Styrene	**2.8**	2.2	4.3	"	"	"	"	"	"	J
o-Xylene	**68**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	ND	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**3.3**	2.5	5.0	"	"	"	"	"	"	J
1,2,4-Trimethylbenzene	**12**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**3.8**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*108 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*105 %*	*78-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*98.0 %*	*77-127*		"	"	"	"	
FTB034-VI-B676-S-09172014 (E409104-02) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		27	ug/m3	5	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	ND	13	25	"	"	"	"	"	"	
Chloromethane	ND	5.2	10	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	18	35	"	"	"	"	"	"	
Vinyl chloride	ND	6.5	13	"	"	"	"	"	"	
Bromomethane	ND	9.9	79	"	"	"	"	"	"	
Chloroethane	ND	6.7	40	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	14	28	"	"	"	"	"	"	
Acetone	**77**	12	120	"	"	"	"	"	"	J
1,1-Dichloroethene	ND	10	20	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	19	39	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**17**	8.8	18	"	"	"	"	"	"	B-03, J
Carbon disulfide	**260**	7.9	32	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	10	40	"	"	"	"	"	"	
1,1-Dichloroethane	ND	10	21	"	"	"	"	"	"	
2-Butanone (MEK)	ND	30	150	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	10	20	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B676-S-09172014 (E409104-02) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Chloroform	**38**	12	25	ug/m3	5	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
1,1,1-Trichloroethane	ND	14	28	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	10	21	"	"	"	"	"	"	
Benzene	**110**	8.1	16	"	"	"	"	"	"	
Carbon tetrachloride	ND	16	32	"	"	"	"	"	"	
Trichloroethene	ND	14	27	"	"	"	"	"	"	
1,2-Dichloropropane	ND	12	47	"	"	"	"	"	"	
Bromodichloromethane	ND	17	34	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	12	23	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	10	41	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	12	23	"	"	"	"	"	"	
Toluene	**100**	9.5	19	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	14	28	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	10	41	"	"	"	"	"	"	
Dibromochloromethane	ND	22	43	"	"	"	"	"	"	
Tetrachloroethene	ND	17	34	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	19	39	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	17	35	"	"	"	"	"	"	
Chlorobenzene	ND	12	23	"	"	"	"	"	"	
Ethylbenzene	**480**	11	22	"	"	"	"	"	"	
m,p-Xylene	**1900**	11	44	"	"	"	"	"	"	
Styrene	**21**	11	22	"	"	"	"	"	"	J
o-Xylene	**830**	11	22	"	"	"	"	"	"	
Bromoform	ND	26	52	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	17	35	"	"	"	"	"	"	
4-Ethyltoluene	ND	12	25	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**23**	12	25	"	"	"	"	"	"	J
1,2,4-Trimethylbenzene	**34**	12	25	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	15	61	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	15	61	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	15	61	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	19	190	"	"	"	"	"	"	
Hexachlorobutadiene	ND	54	270	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*101 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*105 %*	*78-125*		"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B676-S-09172014 (E409104-02) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Surrogate: 4-Bromofluorobenzene			*88.8 %*		*77-127*	*EJ40206*	*02-Oct-14*	*03-Oct-14*	*EPA TO-15*	
FTB034-VI-B676-W-09172014 (E409104-03) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	**11**		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	ND	2.5	5.0	"	"	"	"	"	"	
Chloromethane	**2.1**	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**540**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**35**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**480**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**2.8**	2.0	8.0	"	"	"	"	"	"	J
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**140**	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**3.4**	2.5	4.9	"	"	"	"	"	"	J
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**4.5**	2.1	4.1	"	"	"	"	"	"	
Benzene	**190**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**5.2**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	**9.6**	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**180**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	**3.4**	3.4	6.9	"	"	"	"	"	"	J
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

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Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B676-W-09172014 (E409104-03) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**170**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**640**	2.2	8.8	"	"	"	"	"	"	
Styrene	**15**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**330**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**8.3**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**12**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**34**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*102 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8			*104 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*91.0 %*		*77-127*	"	"	"	"	
FTB034-VI-B670-W-09172014 (E409104-04) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.0**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	**9.2**	2.8	5.6	"	"	"	"	"	"	
Acetone	ND	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.4**	1.8	3.5	"	"	"	"	"	"	B-03, J
Carbon disulfide	**19**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B670-W-09172014 (E409104-04) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
2-Butanone (MEK)	ND	6.0	30	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**7.1**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.3**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**26**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**48**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**20**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**64**	2.2	8.8	"	"	"	"	"	"	
Styrene	**13**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**22**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**4.2**	2.5	5.0	"	"	"	"	"	"	J
1,3,5-Trimethylbenzene	**5.2**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**25**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B670-W-09172014 (E409104-04) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Surrogate: 1,2-Dichloroethane-d4			*103 %*		*76-134*	*EJ40206*	*02-Oct-14*	*02-Oct-14*	*EPA TO-15*	
Surrogate: Toluene-d8			*102 %*		*78-125*	*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene			*95.1 %*		*77-127*	*"*	*"*	*"*	*"*	
FTB034-VI-B670-N-09172014 (E409104-05) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**2.9**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	**2.4**	2.0	16	"	"	"	"	"	"	J
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	**4.2**	2.8	5.6	"	"	"	"	"	"	J
Acetone	**56**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**6.8**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**43**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**6.6**	6.0	30	"	"	"	"	"	"	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**58**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.2**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**99**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**6.8**	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	**10**	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**85**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B670-N-09172014 (E409104-05) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Tetrachloroethene	**3.9**	3.4	6.9	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	J
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**36**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**120**	2.2	8.8	"	"	"	"	"	"	
Styrene	**13**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**39**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**10**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**12**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**37**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*105 %*		*76-134*		*"*	*"*	*"*	
Surrogate: Toluene-d8			*104 %*		*78-125*		*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene			*97.7 %*		*77-127*		*"*	*"*	*"*	
FTB034-VI-B007-N-09172014 (E409104-06) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	ND	2.5	5.0	"	"	"	"	"	"	
Chloromethane	**1.3**	1.0	2.1	"	"	"	"	"	"	J
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**510**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**9.0**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**110**	1.6	6.3	"	"	"	"	"	"	

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120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B007-N-09172014 (E409104-06) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
trans-1,2-Dichloroethene	ND	2.0	8.0	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**68**	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**13**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.3**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**72**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**4.6**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	**3.7**	3.4	6.8	"	"	"	"	"	"	J
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	**4.7**	2.1	8.3	"	"	"	"	"	"	J
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**100**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	**7.1**	2.1	8.3	"	"	"	"	"	"	J
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**40**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**140**	2.2	8.8	"	"	"	"	"	"	
Styrene	**15**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**49**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**18**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**17**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**72**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**6.8**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B007-N-09172014 (E409104-06) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Hexachlorobutadiene	ND	11	54	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Surrogate: 1,2-Dichloroethane-d4			*103 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*107 %*	*78-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*97.0 %*	*77-127*		"	"	"	"	
FTB034-VI-B007-S-09172014 (E409104-07) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.1**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**32**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**2.9**	1.8	3.5	"	"	"	"	"	"	B-03, J
Carbon disulfide	**13**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	ND	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**2.6**	2.5	4.9	"	"	"	"	"	"	J
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**24**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**44**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B007-S-09172014 (E409104-07) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
2-Hexanone (MBK)	ND	2.1	8.3	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	**10**	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**12**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**52**	2.2	8.8	"	"	"	"	"	"	
Styrene	**6.5**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**21**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**9.9**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**11**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**55**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*105 %*		*76-134*		*"*	*"*	*"*	
Surrogate: Toluene-d8			*106 %*		*78-125*		*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene			*101 %*		*77-127*		*"*	*"*	*"*	
FTB034-VI-B539-N-09172014 (E409104-08) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.6**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	**3.9**	2.8	5.6	"	"	"	"	"	"	J
Acetone	ND	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-N-09172014 (E409104-08) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Methylene chloride (Dichloromethane)	**3.1**	1.8	3.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	B-03, J
Carbon disulfide	**15**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**6.4**	6.0	30	"	"	"	"	"	"	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**6.1**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.6**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**21**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**59**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	**3.5**	3.5	7.0	"	"	"	"	"	"	J
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**23**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**72**	2.2	8.8	"	"	"	"	"	"	
Styrene	**14**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**26**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**6.0**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**6.9**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**29**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**4.7**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-N-09172014 (E409104-08) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,2-Dichlorobenzene	ND	3.0	12	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*104 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8			*104 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*97.2 %*		*77-127*	"	"	"	"	
FTB034-VI-B539-E-09172014 (E409104-09) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.2**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	**3.5**	2.0	16	"	"	"	"	"	"	J
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	**3.8**	2.8	5.6	"	"	"	"	"	"	J
Acetone	**400**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.5**	1.8	3.5	"	"	"	"	"	"	B-03, J
Carbon disulfide	**19**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**12**	6.0	30	"	"	"	"	"	"	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**19**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.5**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**35**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**3.0**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-E-09172014 (E409104-09) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Toluene	**51**	1.9	3.8	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	**2.1**	2.1	8.3	"	"	"	"	"	"	J
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	**2.6**	2.3	4.7	"	"	"	"	"	"	J
Ethylbenzene	**19**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**61**	2.2	8.8	"	"	"	"	"	"	
Styrene	**13**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**22**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**7.0**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**19**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**26**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*104 %*	*76-134*			"	"	"	"	
Surrogate: Toluene-d8		*103 %*	*78-125*			"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.6 %*	*77-127*			"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

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Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-S-09172014 (E409104-10) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**2.9**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**33**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.4**	1.8	3.5	"	"	"	"	"	"	B-03, J
Carbon disulfide	**64**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	ND	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**3.6**	2.5	4.9	"	"	"	"	"	"	J
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**26**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**3.6**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**43**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	**2.7**	2.3	4.7	"	"	"	"	"	"	J

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-S-09172014 (E409104-10) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Ethylbenzene	**15**	2.2	4.4	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
m,p-Xylene	**55**	2.2	8.8	"	"	"	"	"	"	
Styrene	**12**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**20**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**4.2**	2.5	5.0	"	"	"	"	"	"	J
1,3,5-Trimethylbenzene	**5.6**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**26**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*105 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*105 %*	*78-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*98.8 %*	*77-127*		"	"	"	"	
FTB034-VI-B539-W-09172014 (E409104-11) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.4**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**34**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**4.6**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**8.2**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	ND	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-W-09172014 (E409104-11) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Chloroform	**4.4**	2.5	4.9	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	J
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**32**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**44**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	**2.6**	2.3	4.7	"	"	"	"	"	"	J
Ethylbenzene	**11**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**44**	2.2	8.8	"	"	"	"	"	"	
Styrene	**8.7**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**15**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**4.4**	2.5	5.0	"	"	"	"	"	"	J
1,3,5-Trimethylbenzene	**5.9**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**25**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*103 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8			*105 %*		*78-125*	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B539-W-09172014 (E409104-11) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Surrogate: 4-Bromofluorobenzene			*96.9 %*		*77-127*	*EJ40206*	*02-Oct-14*	*02-Oct-14*	*EPA TO-15*	
FTB034-VI-B689-S1-09172014 (E409104-12) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	ND	2.5	5.0	"	"	"	"	"	"	
Chloromethane	**2.1**	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**340**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**11**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**110**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**65**	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**14**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.7**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**73**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**3.3**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	**3.4**	3.4	6.8	"	"	"	"	"	"	J
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	**3.8**	2.1	8.3	"	"	"	"	"	"	J
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**130**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	**5.6**	2.1	8.3	"	"	"	"	"	"	J
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-S1-09172014 (E409104-12) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	ug/m3	1	EJ40206	02-Oct-14	02-Oct-14	EPA TO-15	
Chlorobenzene	**4.3**	2.3	4.7	"	"	"	"	"	"	J
Ethylbenzene	**52**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**170**	2.2	8.8	"	"	"	"	"	"	
Styrene	**20**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**63**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**22**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**21**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**88**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**6.2**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*105 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*107 %*	*78-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*98.1 %*	*77-127*		"	"	"	"	
FTB034-VI-B689-S2-09172014 (E409104-13) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.4**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	**2.1**	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**140**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**6.2**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**130**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	

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Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-S2-09172014 (E409104-13) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
2-Butanone (MEK)	**25**	6.0	30	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**5.8**	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**2.8**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**96**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**7.7**	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	**2.5**	2.1	8.3	"	"	"	"	"	"	J
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**150**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	**4.2**	2.1	8.3	"	"	"	"	"	"	J
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	**4.3**	3.4	6.9	"	"	"	"	"	"	J
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	**4.5**	2.3	4.7	"	"	"	"	"	"	J
Ethylbenzene	**43**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**130**	2.2	8.8	"	"	"	"	"	"	
Styrene	**20**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**47**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**17**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**16**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**71**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**6.8**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-S2-09172014 (E409104-13) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
Surrogate: 1,2-Dichloroethane-d4			*105 %*		*76-134*	*EJ40206*	*02-Oct-14*	*03-Oct-14*	*EPA TO-15*	
Surrogate: Toluene-d8			*105 %*		*78-125*	*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene			*96.7 %*		*77-127*	*"*	*"*	*"*	*"*	
FTB034-VI-B689-W2-09172014 (E409104-14) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.2**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	**1.8**	1.0	2.1	"	"	"	"	"	"	J
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**93**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.6**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**16**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**8.4**	6.0	30	"	"	"	"	"	"	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	ND	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**24**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**40**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-W2-09172014 (E409104-14) Vapor Sampled: 17-Sep-14 Received: 22-Sep-14										**J LOD**
Tetrachloroethene	**9.5**	3.4	6.9	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**12**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**48**	2.2	8.8	"	"	"	"	"	"	
Styrene	**6.6**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**19**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**8.9**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**9.0**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**50**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**5.6**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*107 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8			*105 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*98.3 %*		*77-127*	"	"	"	"	
FTB034-VI-B689-W3-09172014 (E409104-15) Vapor Sampled: 17-Sep-14 Received: 22-Sep-14										**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	**3.2**	2.5	5.0	"	"	"	"	"	"	J
Chloromethane	ND	1.0	2.1	"	"	"	"	"	"	
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	**2.8**	2.8	5.6	"	"	"	"	"	"	J
Acetone	**33**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.6**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**10**	1.6	6.3	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-W3-09172014 (E409104-15) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
trans-1,2-Dichloroethene	ND	2.0	8.0	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	ND	6.0	30	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	**3.4**	2.5	4.9	"	"	"	"	"	"	J
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	2.1	4.1	"	"	"	"	"	"	
Benzene	**15**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	ND	2.7	5.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	ND	2.1	8.3	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**38**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
2-Hexanone (MBK)	ND	2.1	8.3	"	"	"	"	"	"	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	ND	2.3	4.7	"	"	"	"	"	"	
Ethylbenzene	**10**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**42**	2.2	8.8	"	"	"	"	"	"	
Styrene	**5.7**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**17**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**7.3**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**8.1**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**40**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**3.3**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-W3-09172014 (E409104-15) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
Hexachlorobutadiene	ND	11	54	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Surrogate: 1,2-Dichloroethane-d4			*107 %*	*76-134*		"	"	"	"	
Surrogate: Toluene-d8			*106 %*	*78-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*95.5 %*	*77-127*		"	"	"	"	
FTB034-VI-B689-N-09172014 (E409104-16) Vapor	**Sampled: 17-Sep-14**	**Received: 22-Sep-14**								**J LOD**
1,1-Difluoroethane (LCC)	ND		5.5	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dichlorodifluoromethane (F12)	ND	2.5	5.0	"	"	"	"	"	"	
Chloromethane	**1.2**	1.0	2.1	"	"	"	"	"	"	J
Dichlorotetrafluoroethane (F114)	ND	3.5	7.1	"	"	"	"	"	"	
Vinyl chloride	ND	1.3	2.6	"	"	"	"	"	"	
Bromomethane	ND	2.0	16	"	"	"	"	"	"	
Chloroethane	ND	1.3	8.0	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	2.8	5.6	"	"	"	"	"	"	
Acetone	**110**	2.4	24	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
1,1,2-Trichlorotrifluoroethane (F113)	ND	3.9	7.7	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	**3.6**	1.8	3.5	"	"	"	"	"	"	B-03
Carbon disulfide	**170**	1.6	6.3	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.0	8.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.1	4.1	"	"	"	"	"	"	
2-Butanone (MEK)	**15**	6.0	30	"	"	"	"	"	"	J
cis-1,2-Dichloroethene	ND	2.0	4.0	"	"	"	"	"	"	
Chloroform	ND	2.5	4.9	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	**3.1**	2.1	4.1	"	"	"	"	"	"	J
Benzene	**93**	1.6	3.2	"	"	"	"	"	"	
Carbon tetrachloride	ND	3.2	6.4	"	"	"	"	"	"	
Trichloroethene	**3.3**	2.7	5.5	"	"	"	"	"	"	J
1,2-Dichloropropane	ND	2.3	9.4	"	"	"	"	"	"	
Bromodichloromethane	ND	3.4	6.8	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
4-Methyl-2-pentanone (MIBK)	**2.3**	2.1	8.3	"	"	"	"	"	"	J
trans-1,3-Dichloropropene	ND	2.3	4.6	"	"	"	"	"	"	
Toluene	**72**	1.9	3.8	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.8	5.5	"	"	"	"	"	"	

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120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOD	LOQ	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
FTB034-VI-B689-N-09172014 (E409104-16) Vapor	**Sampled: 17-Sep-14**		**Received: 22-Sep-14**							**J LOD**
2-Hexanone (MBK)	ND	2.1	8.3	ug/m3	1	EJ40206	02-Oct-14	03-Oct-14	EPA TO-15	
Dibromochloromethane	ND	4.3	8.6	"	"	"	"	"	"	
Tetrachloroethene	ND	3.4	6.9	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	3.9	7.8	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
Chlorobenzene	**3.4**	2.3	4.7	"	"	"	"	"	"	J
Ethylbenzene	**35**	2.2	4.4	"	"	"	"	"	"	
m,p-Xylene	**110**	2.2	8.8	"	"	"	"	"	"	
Styrene	**21**	2.2	4.3	"	"	"	"	"	"	
o-Xylene	**44**	2.2	4.4	"	"	"	"	"	"	
Bromoform	ND	5.2	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	3.5	7.0	"	"	"	"	"	"	
4-Ethyltoluene	**17**	2.5	5.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**20**	2.5	5.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**85**	2.5	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	**5.9**	3.0	12	"	"	"	"	"	"	J
1,4-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	3.0	12	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	3.8	38	"	"	"	"	"	"	
Hexachlorobutadiene	ND	11	54	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4			*101 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8			*103 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene			*94.4 %*		*77-127*	"	"	"	"	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ40206 - TO-15										
Blank (EJ40206-BLK1)				Prepared & Analyzed: 02-Oct-14						
1,1-Difluoroethane (LCC)	ND	5.5	ug/m3							
Dichlorodifluoromethane (F12)	ND	5.0	"							
Chloromethane	ND	2.1	"							
Dichlorotetrafluoroethane (F114)	ND	7.1	"							
Vinyl chloride	ND	2.6	"							
Bromomethane	ND	16	"							
Chloroethane	ND	8.0	"							
Trichlorofluoromethane (F11)	ND	5.6	"							
Acetone	ND	24	"							
1,1-Dichloroethene	ND	4.0	"							
1,1,2-Trichlorotrifluoroethane (F113)	ND	7.7	"							
Methylene chloride (Dichloromethane)	2.4	3.5	"							B-03, J
Carbon disulfide	ND	6.3	"							
trans-1,2-Dichloroethene	ND	8.0	"							
1,1-Dichloroethane	ND	4.1	"							
2-Butanone (MEK)	ND	30	"							
cis-1,2-Dichloroethene	ND	4.0	"							
Chloroform	ND	4.9	"							
1,1,1-Trichloroethane	ND	5.5	"							
1,2-Dichloroethane (EDC)	ND	4.1	"							
Benzene	ND	3.2	"							
Carbon tetrachloride	ND	6.4	"							
Trichloroethene	ND	5.5	"							
1,2-Dichloropropane	ND	9.4	"							
Bromodichloromethane	ND	6.8	"							
cis-1,3-Dichloropropene	ND	4.6	"							
4-Methyl-2-pentanone (MIBK)	ND	8.3	"							
trans-1,3-Dichloropropene	ND	4.6	"							
Toluene	ND	3.8	"							
1,1,2-Trichloroethane	ND	5.5	"							
2-Hexanone (MBK)	ND	8.3	"							
Dibromochloromethane	ND	8.6	"							
Tetrachloroethene	ND	6.9	"							
1,2-Dibromoethane (EDB)	ND	7.8	"							

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
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760-804-9678 Phone
760-804-9159 Fax

Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ40206 - TO-15										
Blank (EJ40206-BLK1)				Prepared & Analyzed: 02-Oct-14						
1,1,1,2-Tetrachloroethane	ND	7.0	ug/m3							
Chlorobenzene	ND	4.7	"							
Ethylbenzene	ND	4.4	"							
m,p-Xylene	ND	8.8	"							
Styrene	ND	4.3	"							
o-Xylene	ND	4.4	"							
Bromoform	ND	10	"							
1,1,2,2-Tetrachloroethane	ND	7.0	"							
4-Ethyltoluene	ND	5.0	"							
1,3,5-Trimethylbenzene	ND	5.0	"							
1,2,4-Trimethylbenzene	ND	5.0	"							
1,3-Dichlorobenzene	ND	12	"							
1,4-Dichlorobenzene	ND	12	"							
1,2-Dichlorobenzene	ND	12	"							
1,2,4-Trichlorobenzene	ND	38	"							
Hexachlorobutadiene	ND	54	"							
Surrogate: 1,2-Dichloroethane-d4	*231*		*"*	*214*		*108*	*76-134*			
Surrogate: Toluene-d8	*219*		*"*	*207*		*106*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*355*		*"*	*364*		*97.4*	*77-127*			
LCS (EJ40206-BS1)				Prepared & Analyzed: 02-Oct-14						
Dichlorodifluoromethane (F12)	91	5.0	ug/m3	101		90.8	70-130			
Vinyl chloride	44	2.6	"	52.0		84.1	70-130			
Chloroethane	48	8.0	"	53.6		89.0	70-130			
Trichlorofluoromethane (F11)	110	5.6	"	113		95.7	70-130			
1,1-Dichloroethene	71	4.0	"	80.8		88.1	70-130			
1,1,2-Trichlorotrifluoroethane (F113)	150	7.7	"	155		98.1	70-130			
Methylene chloride (Dichloromethane)	64	3.5	"	70.8		89.8	70-130			
trans-1,2-Dichloroethene	62	8.0	"	80.8		76.2	70-130			
1,1-Dichloroethane	80	4.1	"	82.4		97.1	70-130			
cis-1,2-Dichloroethene	68	4.0	"	80.0		84.6	70-130			
Chloroform	96	4.9	"	99.2		97.1	70-130			
1,1,1-Trichloroethane	110	5.5	"	111		94.5	70-130			

H&P Mobile
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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ40206 - TO-15										
LCS (EJ40206-BS1)				Prepared & Analyzed: 02-Oct-14						
1,2-Dichloroethane (EDC)	77	4.1	ug/m3	82.4		93.1	70-130			
Benzene	56	3.2	"	64.8		87.0	70-130			
Carbon tetrachloride	120	6.4	"	128		94.0	70-130			
Trichloroethene	100	5.5	"	110		95.6	70-130			
Toluene	67	3.8	"	76.8		86.8	70-130			
1,1,2-Trichloroethane	100	5.5	"	111		91.3	70-130			
Tetrachloroethene	110	6.9	"	138		78.9	70-130			
1,1,1,2-Tetrachloroethane	120	7.0	"	140		84.6	70-130			
Ethylbenzene	79	4.4	"	88.4		89.0	70-130			
m,p-Xylene	170	8.8	"	177		97.8	70-130			
o-Xylene	82	4.4	"	88.4		92.5	70-130			
1,1,2,2-Tetrachloroethane	130	7.0	"	140		89.6	70-130			
Surrogate: 1,2-Dichloroethane-d4	*223*		*"*	*214*		*104*	*76-134*			
Surrogate: Toluene-d8	*212*		*"*	*207*		*103*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*379*		*"*	*364*		*104*	*77-127*			
LCS Dup (EJ40206-BSD1)				Prepared & Analyzed: 02-Oct-14						
Dichlorodifluoromethane (F12)	90	5.0	ug/m3	101		89.7	70-130	1.21	25	
Vinyl chloride	46	2.6	"	52.0		88.6	70-130	5.20	25	
Chloroethane	49	8.0	"	53.6		90.9	70-130	2.11	25	
Trichlorofluoromethane (F11)	110	5.6	"	113		94.6	70-130	1.15	25	
1,1-Dichloroethene	78	4.0	"	80.8		96.0	70-130	8.65	25	
1,1,2-Trichlorotrifluoroethane (F113)	150	7.7	"	155		97.6	70-130	0.457	25	
Methylene chloride (Dichloromethane)	65	3.5	"	70.8		92.2	70-130	2.63	25	
trans-1,2-Dichloroethene	66	8.0	"	80.8		81.4	70-130	6.57	25	
1,1-Dichloroethane	83	4.1	"	82.4		101	70-130	4.22	25	
cis-1,2-Dichloroethene	76	4.0	"	80.0		94.8	70-130	11.4	25	
Chloroform	96	4.9	"	99.2		96.3	70-130	0.772	25	
1,1,1-Trichloroethane	100	5.5	"	111		93.4	70-130	1.16	25	
1,2-Dichloroethane (EDC)	77	4.1	"	82.4		93.1	70-130	0.0535	25	
Benzene	60	3.2	"	64.8		92.6	70-130	6.17	25	
Carbon tetrachloride	120	6.4	"	128		90.8	70-130	3.51	25	
Trichloroethene	100	5.5	"	110		94.7	70-130	0.888	25	

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	LOQ	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ40206 - TO-15										
LCS Dup (EJ40206-BSD1)				Prepared & Analyzed: 02-Oct-14						
Toluene	67	3.8	ug/m3	76.8		87.8	70-130	1.20	25	
1,1,2-Trichloroethane	100	5.5	"	111		90.8	70-130	0.599	25	
Tetrachloroethene	110	6.9	"	138		78.5	70-130	0.632	25	
1,1,1,2-Tetrachloroethane	120	7.0	"	140		83.2	70-130	1.66	25	
Ethylbenzene	79	4.4	"	88.4		88.9	70-130	0.112	25	
m,p-Xylene	170	8.8	"	177		97.3	70-130	0.459	25	
o-Xylene	82	4.4	"	88.4		93.3	70-130	0.857	25	
1,1,2,2-Tetrachloroethane	120	7.0	"	140		87.9	70-130	1.96	25	
Surrogate: 1,2-Dichloroethane-d4	*225*		"	*214*		*105*	*76-134*			
Surrogate: Toluene-d8	*209*		"	*207*		*101*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*368*		"	*364*		*101*	*77-127*			

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Notes and Definitions

J LOD	This sample is reported to standard LOD determined for this method. All confirmed hits above the reported LOD value and below the LOQ, will be flagged with a "J" result. If an LOD is not listed, the analyte is ND at the LOQ.
J	Detected but below the RL/LOQ; therefore, result is an estimated concentration.
J	Detected but below the RL/LOQ; therefore, result is an estimated concentration.
B-03	Analyte present in the blank above the reported LOD but below the reporting limit.
B-03	Analyte present in the blank above the reported LOD but below the reporting limit.
ND	Analyte NOT DETECTED at or above the reporting limit or LOQ
RPD	Relative Percent Difference
LOD	Limit of Detection
LOQ	Limit of Quantitation

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Atlas Geo-Sampling Company	Project: AG092214-14	
120 Nottaway Lane	Project Number: SH4906.011 / Puerto Rico	Reported:
Alpharetta, GA 30009	Project Manager: Mr. Jim Fineis	06-Oct-14 09:54

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory (Certification # L11-175) in accordance with the DoD-ELAP program. H&P is approved by the State of Arizona under Certification Numbers AZM758 and AZ0779. H&P is approved as an Environmental Laboratory in conformance with the Environmental Laboratory Accreditation Program (CA) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste for the following methods:

Certificate# 2741, 2743, 2579, 2754 & 2740 approved for EPA 8260 and LUFT GC/MS
Certificate# 2742, 2745, & 2741 approved for LUFT
Certificate# 2745 & 2742 approved for EPA 418.1

H&P Mobile Geochemistry, Inc. is approved as an Environmental Laboratory in conformance with the National Environmental Accreditation Conference Standards for the category Environmental Analysis Air and Emissions for the following analytes and methods:

Hexachlorobutadiene by EPA TO-15 & TO-14A
1,2,4-Trichlorobenzene by EPA TO-15 & TO-14A
1,2-Dichlorobenzene by EPA TO-15 & TO-14A
Dichlorotetrafluoroethane by EPA TO-14A
1,4-Dichlorobenzene by EPA TO-15 & TO-14A
Benzene by EPA TO-15 & TO-14A
Chlorobenzene by EPA TO-15 & TO-14A
Ethyl benzene by EPA TO-15 & TO-14A
Styrene by EPA TO-15 & TO-14A
Toluene by EPA TO-15 & TO-14A
Total Xylenes by EPA TO-15
1,1,1-Trichloroethane by EPA TO-15 & TO-14A
1,1,2,2-Tetrachloroethane by EPA TO-15 & TO-14A
1,1,2-Trichloroethane by EPA TO-15 & TO-14A
1,1-Dichloroethane by EPA TO-15 & TO-14A
1,1-Dichloroethene by EPA TO-15 & TO-14A
1,2-Dichloroethane by EPA TO-15 & TO-14A
1,2-Dichloropropane by EPA TO-15 & TO-14A
Benzyl Chloride by EPA TO-15 & TO-14A
Bromoform by EPA TO-15
Bromomethane by EPA TO-15 & TO-14A
Carbon tetrachloride by EPA TO-15 & TO-14A
Chloroethane by EPA TO-15 & TO-14A
Chloroform by EPA TO-15 & TO-14A
Chloromethane by EPA TO-15 & TO-14A
cis-1,2-Dichloroethene by EPA TO-15 & TO-14A
cis-1,3-Dichloropropene by EPA TO-15 & TO-14A
Methylene chloride by EPA TO -15 & TO-14A
Tetrachloroethane by EPA TO-15 & TO-14A
trans-1,2-Dichloroethene by EPA TO-15
trans-1,3-Dichloropropene by EPA TO-15 & TO-14A
Trichloroethene by EPA TO-15 & TO-14A
Vinyl chloride by EPA TO -15
2-Butanone by EPA TO-15
4-Methyl-2-Pentanone by EPA TO-15
Hexane by EPA TO-15
Methyl tert-butyl ether by EPA TO-15
Vinyl acetate by EPA TO-15

1,3-Dichlorobenzene by EPA TO-15 & TO-14A
Trichlorofluoromethane by EPA TO-14A
Naphthalene by H&P SOP TO-15/GC-MS
1,2-Dibromoethane (EDB) by EPA TO-15 & TO-14A
1,2-Dibromo-3-chloropropane by EPA TO-15
1,3-Butadiene by EPA TO-15
1,1,2-Trichlorotrifluoroethane by EPA TO-14A
Carbon disulfide by EPA TO-15
1,4-Dioxane by EPA TO-15

This certification applies to samples analyzed in summa canisters.

H&P Mobile Geochemistry, Inc.

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VAPOR / AIR Chain of Custody

DATE: 9/18/14
Page 1 of 2

Lab Client and Project Information

Lab Client/Consultant: Atlas Geo sampling
Lab Client Project Manager: Jim Finnis
Lab Client Address: 120 Nottaway Lane
Lab Client City, State, Zip: Alpharetta, GA 30009
Phone Number: 770 883 3372

Project Name / #: SH4906.011 JF
Project Location: Fort Buchanan ~~Ft Bliss~~ Puerto Rico
Report E-Mail(s): jimfinnis@atlasgeo.com

Sample Receipt (Lab Use Only)

Date Rec'd: 9/22/14 Control #: 140685.01
H&P Project #: AG092214-14
Lab Work Order #: E409104
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below
Receipt Gauge ID: 11167 Temp: 23°C
Outside Lab:
Receipt Notes/Tracking #: FEDEX 8043 0389 5599
Lab PM Initials: SN

Reporting Requirements

☒ Standard Report ☒ Level III ~~☒ Level IV~~ LSE 10/15/14
☒ Excel EDD ☐ Other EDD:
☐ CA Geotracker Global ID:

Turnaround Time

☒ 5-7 day Stnd ☐ 24-Hr Rush
☐ 3-day Rush ☐ Mobile Lab
☐ 48-Hr Rush ☐ Other:

Sampler Information

Sampler(s): Jim Finnis
Signature:
Date: 9-18-14

Additional Instructions to Laboratory: A Level III within 14 days
☒ Check if Project Analyte List is Attached
* Preferred VOC units (please choose one): 90% level 3 within 21 days ~~10% level 4 10 21 days~~ LSE 10/15/14
☐ µg/L ☒ µg/m³ ☐ ppbv ☐ ppmv → LOQ/LOD REPORT SN

SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa or Tedlar or Tube	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☐ 8260SV ☐ TO-15	VOCs Short List / Project List ☐ 8260SV ☐ TO-15	Oxygenates ☐ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15 ☐ TO-17m	TPHv as Gas ☐ 8260SVm ☐ TO-15m	TPHv as Diesel (sorbent tube) ☐ TO-17m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☐ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2			
FTB034-VI-B665-S-0	09172014	9-17-14	940	SV	400 ml	368	-1.75	/												
FTB034-VI-B676-S-0	09172014	9-17-14	1005	SV	400 ml	293	-2.43	/												
FTB034-VI-B676-W-	09172014	9-17-14	1036	SV	400 ml	214	-1.38	/												
FTB034-VI-B676-W-	09172014	9-17-14	1050	SV	400 ml	207	-1.71	/												
FTB034-VI-B670-N-	09172014	9-17-14	1110	SV	400 ml	355	-2.04	/												
FTB034-VI-B007-N-	09172014	9-17-14	1500	SV	400 ml	151	-2.00	/												
FTB034-VI-B007-S-	09172014	9-17-14	1600	SV	400 ml	462	-1.52	/												
FTB034-VI-B539-N-	09172014	9-17-14	1220	SV	400 ml	461	-1.67	/												
FTB034-VI-B539-E-	09172014	9-17-14	1240	SV	400 ml	049	-2.38	/												
FTB034-VI-B539-S-	09172014	9-17-14	1300	SV	400 ml	255	-2.42	/												

Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
	Atlas	9-18-14	1030		H&P	9/22/14	1430
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

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VAPOR / AIR Chain of Custody

DATE: 9-18-14
Page 2 of 2

Lab Client and Project Information

Lab Client/Consultant: Atlas Geo Sampling	Project Name / #: SH4906.011
Lab Client Project Manager: Jim Fineis	Project Location: Fort Buchanan, Puerto Rico
Lab Client Address: 120 Nathaniel Lane	Report E-Mail(s): Jimfineis@atlasgeo.com
Lab Client City, State, Zip: Alpharetta, GA 30009	
Phone Number: 770 883 3372	

Sample Receipt (Lab Use Only)

Date Rec'd: 9/22	Control #: 140685.01
H&P Project #: AG092214-14	
Lab Work Order #: E409104	
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below	
Receipt Gauge ID: 11167	Temp: 23°C
Outside Lab:	
Receipt Notes/Tracking #: FEDEX 8043 0389 5559	
Lab PM Initials: SN	

Reporting Requirements

☒ Standard Report ☒ Level III ☒ Level IV
LSE 10/15/14
☒ Excel EDD ☐ Other EDD:
☐ CA Geotracker Global ID:

Turnaround Time

☑ 5-7 day Stnd ☐ 24-Hr Rush
☐ 3-day Rush ☐ Mobile Lab
☐ 48-Hr Rush ☐ Other:

Sampler Information

Sampler(s): Jim Fineis
Signature:
Date: 9-18-14

Additional Instructions to Laboratory:

☒ Check if Project Analyte List is Attached SEE PAGE 1 (SN)

*** Preferred VOC units (please choose one):**

☐ µg/L ☑ µg/m³ ☐ ppbv ☐ ppmv → LOD/LOQ REPORT (SN)

SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa or Tedlar or Tube	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☐ 8260SV ☑ TO-15	VOCs Short List / Project List ☐ 8260SV ☐ TO-15	Oxygenates ☐ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15 ☐ TO-17m	TPHv as Gas ☐ 8260SVm ☐ TO-15m	TPHv as Diesel (sorbent tube) ☐ TO-17m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☐ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2			
FTB034-VI-B539-W-09172014		9-17-14	1315	SV	400 ml	362	-2.12	1												
FTB034-VI-B689-S1-09172014		9-17-14	1340	SV	400 ml	004	-2.09	1												
FTB034-VI-B689-S2-09172014		9-17-14	1400	SV	400 ml	253	-14.40	1												
FTB034-VI-B689-W2-09172014		9-17-14	1450	SV	400 ml	208	-1.79	1												
FTB034-VI-B689-W3-09172014		9-17-14	1505	SV	400 ml	105	-1.83	1												
FTB034-VI-B689-N-09172014		9-17-14	1530	SV	400 ml	137	-2.17	1												

Approved/Relinquished by:	Company: Atlas	Date: 9-18-14	Time: 2030	Received by:	Company: H&P	Date: 9/22/14	Time: 1430
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

FOR: AG092214-14 (1/2)

H&P

H&P Mobile Geochemistry, Inc. 2470 Impala Drive, Carlsbad, CA 92010
LA Field Office: 1855 Coronado Avenue, Signal Hill, CA 90755
Ph: 800-834-9888 www.handpmg.com

EPA Method TO-15
Standard List VOCs
400mL Summa Canister
Project Information: Atlas GeoSampling / Puerto Rico

Compound	CAS #	LOQ	MDL	LODs	LOQ	MDL	LODs
			Vapor (µg/m^3)			Vapor (ppbv)	
Dichlorodifluoromethane (F12)	75-71-8	5.0	0.64	2.51	1.0	0.13	0.5
Chloromethane	74-87-3	2.1	0.43	1.04	1.0	0.21	0.5
Dichlorotetrafluoroethane (F114)	76-14-2	7.1	0.88	3.53	1.0	0.13	0.5
Vinyl chloride	75-01-4	2.6	0.95	1.30	1.0	0.37	0.5
Bromomethane	74-83-9	15.8	1.21	1.97	4.0	0.31	0.5
Chloroethane	75-00-3	8.0	0.80	1.34	3.0	0.30	0.5
Acetone	67-64-1	24.1	1.64	2.41	10.0	0.68	1
Trichlorofluoromethane (F11)	75-69-4	5.6	0.97	2.82	1.0	0.17	0.5
1,1-Dichloroethene	75-35-4	4.0	1.53	2.01	1.0	0.38	0.5
Methylene chloride (Dichloromethane)	75-09-2	3.5	0.95	1.76	1.0	0.27	0.5
1,1,2-Trichlorotrifluoroethane (F113)	76-13-1	7.7	1.82	3.86	1.0	0.24	0.5
Carbon disulfide	75-15-0	6.3	0.89	1.58	2.0	0.28	0.5
trans-1,2-Dichloroethene	156-60-5	8.0	0.91	2.01	2.0	0.23	0.5
1,1-Dichloroethane	75-34-3	4.1	1.35	2.05	1.0	0.33	0.5
2-Butanone (MEK)	78-93-3	29.9	1.96	5.98	10.0	0.66	2
cis-1,2-Dichloroethene	156-59-2	4.0	1.26	2.01	1.0	0.31	0.5
Chloroform	67-66-3	4.9	1.30	2.47	1.0	0.26	0.5
1,2-Dichloroethane (EDC)	107-06-2	4.1	1.29	2.05	1.0	0.32	0.5
1,1,1-Trichloroethane	71-55-6	5.5	1.10	2.76	1.0	0.20	0.5
Benzene	71-43-2	3.2	0.72	1.62	1.0	0.22	0.5
Carbon tetrachloride	56-23-5	6.4	0.93	3.20	1.0	0.15	0.5
1,2-Dichloropropane	78-87-5	9.4	1.52	2.34	2.0	0.33	0.5
Bromodichloromethane	75-27-4	6.8	1.58	3.40	1.0	0.23	0.5
Trichloroethene	79-01-6	5.5	1.36	2.73	1.0	0.25	0.5
cis-1,3-Dichloropropene	10061-01-5	4.6	0.83	2.30	1.0	0.18	0.5
4-Methyl-2-pentanone (MIBK)	108-10-1	8.3	1.02	2.07	2.0	0.25	0.5
trans-1,3-Dichloropropene	10061-02-6	4.6	0.99	2.30	1.0	0.22	0.5
1,1,2-Trichloroethane	79-00-5	5.5	0.65	2.76	1.0	0.12	0.5
Toluene	108-88-3	3.8	1.08	1.91	1.0	0.28	0.5
2-Hexanone (MBK)	591-78-6	8.3	1.27	2.07	2.0	0.31	0.5

FOR: A6092214-14 (2/2)

H&P

H&P Mobile Geochemistry, Inc. 2470 Impala Drive, Carlsbad, CA 92010
LA Field Office: 1855 Coronado Avenue, Signal Hill, CA 90755
Ph: 800-834-9888 www.handpmg.com

EPA Method TO-15
Standard List VOCs
400mL Summa Canister
Project Information: Atlas GeoSampling / Puerto Rico

Compound	CAS #	LOQ	MDL	LODs	LOQ	MDL	LODs
			Vapor ($\mu g/m^3$)			Vapor (ppbv)	
Dibromochloromethane	124-48-1	8.6	1.63	4.32	1.0	0.19	0.5
1,2-Dibromoethane (EDB)	106-93-4	7.8	1.74	3.90	1.0	0.22	0.5
Tetrachloroethene	127-18-4	6.9	1.43	3.44	1.0	0.21	0.5
1,1,1,2-Tetrachloroethane	630-20-6	7.0	0.98	3.49	1.0	0.14	0.5
Chlorobenzene	108-90-7	4.7	1.05	2.34	1.0	0.22	0.5
Ethylbenzene	100-41-4	4.4	0.90	2.20	1.0	0.21	0.5
m,p-Xylene	179601-23-1	8.8	2.12	2.20	2.0	0.48	0.5
Bromoform	75-25-2	10.5	1.75	5.25	1.0	0.17	0.5
Styrene	100-42-5	4.3	1.08	2.16	1.0	0.25	0.5
1,1,2,2-Tetrachloroethane	79-34-5	7.0	1.56	3.49	1.0	0.22	0.5
o-Xylene	95-47-6	4.4	1.13	2.20	1.0	0.26	0.5
4-Ethyltoluene	622-96-8	5.0	1.45	2.49	1.0	0.29	0.5
1,3,5-Trimethylbenzene	108-67-8	5.0	1.52	2.49	1.0	0.31	0.5
1,2,4-Trimethylbenzene	95-63-6	5.0	1.43	2.49	1.0	0.29	0.5
1,3-Dichlorobenzene	541-73-1	12.2	1.59	3.05	2.0	0.26	0.5
1,4-Dichlorobenzene	106-46-7	12.2	1.71	3.05	2.0	0.28	0.5
1,2-Dichlorobenzene	95-50-1	12.2	1.71	3.05	2.0	0.28	0.5
1,2,4-Trichlorobenzene	120-82-1	7.5	2.74	3.76	1.0	0.37	0.5
Hexachlorobutadiene	87-68-3	10.7	6.64	5.35	1.0	0.62	0.5
1,1-Diluoroethane	75-37-6	5.4		2.30	2.0		0.5

ATLAS GEO-SAMPLING COMPANY

PUERTO RICO (SH4906.011)

H&P PROJECT # AG092214-14

LEVEL III DATA PACKAGE

Level III Data Package Narrative

Project: AG092214-14

Client: Atlas Geo-Sampling Company

Subject: Narrative

Per communication with an Atlas Geo-Sampling representative on October 15, 2014, a Level IV data package for 10% of the samples was no longer needed for this project. Per the client request, a Level III package is being submitted.

Response Factor Report GCMS 9

Method Path : C:\msdchem\1\METHODS\
Method File : 091514PPBV.M
Title : EPA TO-15 Analysis GC/MS #9
Last Update : Tue Sep 16 11:30:41 2014
Response Via : Initial Calibration

Calibration Files
5 =5ppbV.D 10 =10ppbV.D 50 =50ppbV.D 100 =100ppbV.D 20 =20ppbV.D 200 =200ppbV.D 1 =1ppbV.D 2 =2ppbV.D
500 =500ppbV.D

		Compound	5	10	50	100	20	200	1	2	500	Avg	%RSD
1)	I	Bromochloromethane	----------ISTD----------										
2)	T	1,1,1-Trifluor...	1.895	1.596	1.337	1.391	1.384	1.200	1.505	1.434	0.854	1.399	20.17
3)	T	1,1,1,2-Tetraf...	1.189	1.024	0.785	0.842	0.882	0.770	0.884	0.948	0.764	0.899	15.43
4)	TC	1,1 Difluoroet...	0.870	0.756	0.596	0.662	0.662	0.597	0.676	0.670	0.567	0.673	13.78
5)	TC	Propene	0.424	0.401	0.374	0.430	0.371	0.391	0.358	0.327	0.367	0.383	8.49
6)	TC	Dichlorodifluo...	3.391	2.830	2.200	2.298	2.434	2.099	2.624	2.672	1.976	2.503	17.40
7)	TC	Chloromethane	0.843	0.685	0.537	0.600	0.603	0.537	0.728	0.664	0.499	0.633	17.27
8)	TC	Dichlorotetraf...	3.812	3.212	2.420	2.636	2.781	2.398	2.940	2.922	2.196	2.813	17.43
9)	TC	Vinyl Chloride	1.113	0.942	0.753	0.828	0.832	0.782	0.822	0.860	0.709	0.849	14.03
10)	TC	1,3-Butadiene	0.713	0.606	0.501	0.542	0.533	0.515	0.391	0.590	0.465	0.540	16.98
11)	TC	Bromomethane	1.423	1.113	0.891	0.973	0.969	0.910	0.936	1.187	0.853	1.028	17.75
12)	TC	Chloroethane	0.548	0.496	0.393	0.427	0.420	0.399	0.331	0.498	0.357	0.430	16.50
13)	TC	Ethanol	0.279	0.323	0.281	0.270	0.281	0.227			0.229	0.270	12.36
14)	TC	Trichlorofluor...	3.908	3.126	2.428	2.578	2.753	2.543	2.974	3.038	2.302	2.850	17.12
15)	TC	Acetone	0.391	0.401	0.351	0.362	0.359	0.320	0.219	0.316	0.299	0.335	16.50
16)	TC	Isopropyl Alcohol	0.853	1.238	1.166	1.195	1.180	1.077	0.582	0.658	0.993	0.993	24.49
17)	TC	1,1-Dichloroet...	1.190	1.196	1.218	1.333	1.295	1.285	0.721	0.798	1.124	1.129	19.46
18)	TC	tert-Butyl Alc...	1.358	1.372	1.542	1.687	1.557	1.655		0.845	1.391	1.426	18.69
19)	TC	1,1,2-Trichlor...	2.889	2.397	1.937	2.048	2.154	1.969	2.182	2.209	1.758	2.171	15.00
20)	TC	Methylene Chlo...	1.161	0.926	0.764	0.807	0.828	0.770	1.249	1.006	0.683	0.911	21.18
21)	TC	Carbon Disulfide	2.921	2.434	2.260	2.462	2.347	2.426	2.059	2.101	2.125	2.348	11.24
22)	TC	trans-1,2-Dich...	1.089	0.971	1.083	1.222	0.998	1.205	0.765	0.817	1.038	1.021	15.21
23)	TC	Methyl tert-Bu...	1.826	1.766	1.995	2.393	1.864	2.408	1.000	1.187	1.972	1.823	26.06
24)	TC	Vinyl Acetate	1.383	1.273	1.501	1.785	1.358	1.788	0.654	0.882	1.549	1.353	28.08
25)	TC	1,1-Dichloroet...	1.831	1.528	1.392	1.540	1.415	1.499	1.371	1.380	1.276	1.470	10.86
26)	TC	2-Butanone	0.324	0.300	0.362	0.425	0.331	0.419	0.175	0.213	0.357	0.323	26.13
27)	TC	n-Hexane	1.182	1.016	0.949	1.096	0.960	1.075	0.692	0.771	0.903	0.960	16.27
28)	TC	cis-1,2-Dichlo...	0.979	0.807	0.958	1.154	0.848	1.138	0.630	0.692	0.979	0.909	19.94
29)	TC	Di-isopropyl E...	2.346	2.059	2.087	2.481	2.067	2.451	1.407	1.435	1.998	2.037	19.25
30)	TC	Ethyl Acetate	0.269	0.240	0.223	0.257	0.232	0.250	0.094	0.167	0.213	0.216	25.19
31)	TC	Chloroform	2.942	2.395	1.918	2.094	2.095	2.013	2.229	2.194	1.770	2.183	15.43
32)	TC	2,2-Dichloropr...	2.201	1.854	1.560	1.787	1.662	1.749	1.672	1.706	1.536	1.747	11.32#
33)	TC	Tetrahydrofuran	0.373	0.317	0.361	0.431	0.337	0.424	0.182	0.198	0.361	0.332	26.65
34)	TC	Ethyl-tert-But...	2.049	1.974	2.062	2.445	2.011	2.465	0.888	1.052	1.989	1.882	29.29
35)	S	1,2-Dichloroet...	1.348	1.325	1.244	1.240	1.265	1.209	1.361	1.358	1.122	1.275	6.33
36)	TC	1,1,1-Trichlor...	2.935	2.413	1.986	2.224	2.152	2.137	2.147	2.303	1.916	2.246	13.29
37)	TC	1,2-Dichloroet...	1.822	1.461	1.206	1.329	1.284	1.282	1.356	1.291	1.150	1.354	14.50
38)	TC	1,1-Dichloropr...	1.017	0.929	1.202	1.444	1.020	1.440	0.759	0.715	1.225	1.083	24.52#

Method Path : C:\msdchem\1\METHODS\
Method File : 091514PPBV.M
Title : EPA TO-15 Analysis GC/MS #9

39)	TC	Benzene	3.101	2.600	2.500	2.870	2.503	2.846	1.815	1.972	2.432	2.516	16.50
40)	TC	Carbon Tetrach...	3.187	2.706	2.161	2.381	2.379	2.285	2.577	2.577	2.129	2.487	13.13
41)	TC	Cyclohexane	1.432	1.149	1.019	1.202	1.046	1.187	1.649	1.343	1.042	1.230	17.07
42)	I	1,4-Difluorobenzene	----------ISTD----------										
43)	TC	tert Amyl Meth...	0.556	0.489	0.539	0.660	0.514	0.688	0.354	0.343	0.621	0.529	23.04
44)	TC	2,2,4-Trimethy...	1.081	0.919	0.866	0.987	0.879	0.964	0.518	0.620	0.913	0.861	20.82#
45)	TC	n-Heptane	0.212	0.194	0.202	0.237	0.197	0.237	0.107	0.123	0.218	0.192	24.28
46)	TC	Trichloroethene	0.470	0.403	0.347	0.371	0.377	0.363	0.298	0.310	0.351	0.366	13.95
47)	TC	Dibromomethane	0.384	0.335	0.283	0.311	0.301	0.307	0.318	0.328	0.297	0.318	9.18#
48)	TC	1,2-Dichloropr...	0.272	0.230	0.212	0.240	0.221	0.240	0.211	0.203	0.216	0.227	9.36
49)	TC	1,4-Dioxane	0.153	0.145	0.163	0.171	0.156	0.168		0.092	0.161	0.151	16.65
50)	TC	Bromodichlorom...	0.759	0.646	0.558	0.630	0.585	0.606	0.596	0.570	0.584	0.615	9.86
51)	TC	cis-1,3-Dichlo...	0.384	0.352	0.391	0.457	0.374	0.456	0.218	0.223	0.433	0.365	24.55
52)	TC	4-Methyl-2-pen...	0.411	0.387	0.413	0.463	0.406	0.453	0.218	0.228	0.420	0.378	24.02
53)	TC	trans-1,3-Dich...	0.384	0.352	0.391	0.457	0.374	0.456	0.218	0.223	0.433	0.365	24.55
54)	TC	1,3-Dichloropr...	0.571	0.482	0.414	0.451	0.458	0.434	0.427	0.456	0.414	0.456	10.58#
55)	TC	Toluene	1.193	1.010	0.926	1.027	0.962	1.001	0.938	0.882	0.946	0.987	9.06
56)	S	Toluene-d8	0.905	0.907	0.896	0.923	0.906	0.932	0.935	0.951	0.896	0.917	2.13
57)	TC	1,1,2-Trichlor...	0.442	0.371	0.327	0.353	0.336	0.348	0.336	0.335	0.337	0.354	10.03
58)	TC	2-Hexanone	0.191	0.207	0.239	0.273	0.227	0.273		0.114	0.267	0.224	24.08
59)	TC	Dibromochlorom...	0.834	0.722	0.652	0.723	0.685	0.714	0.643	0.647	0.717	0.704	8.38
60)	TC	Tetrachloroethene	0.623	0.529	0.514	0.564	0.518	0.551	0.475	0.464	0.551	0.532	9.04
61)	TC	1,2-Dibromoethane	0.659	0.567	0.538	0.595	0.544	0.585	0.482	0.477	0.580	0.558	10.20
62)	I	Chlorobenzene-d5	----------ISTD----------										
63)	TC	1,1,1,2-Tetrac...	4.491	3.812	3.223	3.332	3.401	3.274	3.874	3.652	3.243	3.589	11.66
64)	TC	Chlorobenzene	7.703	6.350	5.482	5.749	5.845	5.694	6.433	6.384	5.636	6.142	11.16
65)	TC	Ethylbenzene	7.771	7.682	8.460	9.205	8.104	9.167	4.570	4.754	7.113	7.425	22.99
66)	TC	m,p-Xylene	8.020	7.397	6.982	7.252	7.169	7.146	3.748	4.490	4.754	6.329	24.46
67)	TC	Styrene	4.377	4.514	5.357	5.858	4.976	5.948	2.294	2.494	5.794	4.623	29.95
68)	TC	o-Xylene	8.508	7.948	7.419	7.519	7.648	7.352	4.081	4.661	6.582	6.858	21.96
69)	TC	Bromoform	5.707	4.954	4.615	4.873	4.661	4.828	4.104	4.267	4.738	4.750	9.58
70)	TC	1,1,2,2-Tetrac...	7.316	6.315	5.221	5.228	5.624	5.081	5.924	6.011	4.801	5.725	13.51
71)	S	4-Bromofluorob...	4.119	4.269	4.160	4.187	4.212	4.234	4.025	4.137	4.339	4.187	2.18
72)	TC	1,2,3-Trichlor...	5.626	4.732	4.028	3.976	4.298	3.904	4.411	4.326	3.794	4.344	12.95#
73)	TC	Isopropylbenzene	1.286	1.148	1.087	1.124	1.114	1.107	0.922	0.922	0.756	1.052	E1 14.99#
74)	TC	Bromobenzene	4.991	4.482	4.008	3.964	4.175	3.876	3.637	3.866	3.930	4.103	9.90#
75)	TC	2-Chlorotoluene	3.619	3.350	3.236	3.074	3.226	3.085	1.942	2.287	3.032	2.983	17.78#
76)	TC	4-Chlorotoluene	3.727	3.323	2.920	2.928	3.208	2.844	2.185	2.608	3.032	2.975	14.68#
77)	TC	n-Propylbenzene	2.594	2.444	2.190	2.173	2.300	1.756	1.355	1.628	0.968	1.934	E1 28.00#
78)	TC	4-Ethyltoluene	1.334	1.191	1.127	1.097	1.171	1.076	0.781	0.853	0.751	1.043	E1 19.30
79)	TC	1,3,5-Trimethy...	1.199	1.077	0.964	0.929	1.003	0.930	0.656	0.790	0.673	0.913	E1 19.69
80)	TC	tert-Butylbenzene	1.351	1.246	1.085	1.042	1.154	1.001	0.703	0.930	0.765	1.031	E1 20.47#
81)	TC	1,2,4-Trimethy...	1.209	1.125	1.017	0.957	1.066	0.919	0.658	0.796	0.727	0.941	E1 19.69
82)	TC	1,3-Dichlorobe...	9.944	8.991	7.808	7.252	8.588	7.142	7.958	8.276	6.433	8.044	13.15
83)	TC	Benzyl Chloride	8.404	8.161	8.569	8.343	8.237	8.396	6.043	6.669	6.906	7.748	12.13
84)	TC	1,4-Dichlorobe...	1.073	0.923	0.785	0.695	0.828	0.659	0.728	0.830	0.617	0.793	E1 17.87

Method Path : C:\msdchem\1\METHODS\
Method File : 091514PPBV.M
Title : EPA TO-15 Analysis GC/MS #9

85)	TC	sec-Butylbenzene	1.811	1.640	1.428	1.374	1.499	1.300	1.035	1.288	0.787	1.351	E1 22.62#
86)	TC	p-Isopropyltol...	1.494	1.404	1.328	1.268	1.366	1.219	0.818	1.051	0.763	1.190	E1 21.72#
87)	TC	1,2-Dichlorobe...	9.440	8.336	7.588	6.831	8.002	6.570	7.424	7.827	6.246	7.585	12.90
88)	TC	n-Butylbenzene	1.344	1.269	1.172	1.053	1.224	1.009	0.752	0.934	0.726	1.054	E1 20.91#
89)	TC	1,2-Dibromo-3-...	4.354	3.881	3.396	3.002	3.613	2.839	3.573	3.880	2.790	3.481	15.18#
90)	TC	Naphthalene	1.723	1.716	1.736	1.523	1.695	1.370	1.062	1.180	0.859	1.429	E1 23.05
91)	TC	1,2,4-Trichlor...	7.936	7.513	7.845	6.060	7.700	5.473	5.645	5.775	5.051	6.555	17.82
92)	TC	1,2,3-Trichlor...	8.958	8.370	7.831	5.752	7.936	4.750	6.573	6.713	4.494	6.820	23.27#
93)	TC	Hexachlorobuta...	8.618	7.280	5.699	4.409	6.525	3.771		8.580		6.412	29.75

(#) = Out of Range

TO-15 ANALYSIS LOG
Lab #: **TO-15**
Instrument #: HPMS **9**

Client(s): Atlas Geo
Terraphase

H&P Project #'s: AG092214-14
TP092914-10

Page: **1** of **1**
Operator: ***CSP***
Date: **10/2/2014**

Work Order(s): E409104
E409127

Ical Method(s): **091514ppbV** **082514TPH-MASS-50cc**
Analyses: **TO-15** **082514TPH-UTAH-50cc-uG/m3**
Batch #'s: **EJ40206** **082514VPH-LA-50cc**

Standards

1st Src ID	ACC-1240	Exp.	10/17/2014	Conc. - 10 ppbV	cc Injection:	100
2nd Src ID	ACC-1246	Exp.	10/26/2014	Conc. - 10 ppbV	cc Injection:	100
TPH Std	ACC-1235	Exp.	10/10/2104	Conc. - 250 ppbV	cc Injection:	100
IS/SU ID	AIS-754	Exp.	10/17/2014	Conc. - 50 ppbV	cc Injection:	50

Preparation Log

Run Log Lab Temp (°C) high: **25** low: **21**

Workorder Number	status	Sample Dilution	volume analyzed(cc)	final dilution factor	stn/ port #	Sample Name	Data File Name	Comments
100cc10ppbV		1.00	100	1.0	1-1	CCV20	CCV20A	OK
100cc10ppbV		1.00	100	1.0	1-1	CCV20	CCV20B	OK
EJ40206-BLK1		1.00	50	1.0	1-1	BLANK1	BLANK1	OK
LCS		1.00	100	1.0	2-9	LCS	LCS	OK
LCSD		1.00	100	1.0	2-9	LCSD	LCSD	OK
BLANK-50cc		1.00	50	1.0	1-1	BLANK2	BLANK2	OK
E409104-01		2.32	116	1.0	1-2	Atlas-B665-S	Atlas-B665-S	OK
E409104-02		2.38	119	1.0	1-3	Atlas-B676-S	Atlas-B676-S	I.S. Out
E409104-03		2.25	113	1.0	1-4	Atlas-B676-W	Atlas-B676-W	OK
E409104-04		2.32	116	1.0	1-5	Atlas-B670-W	Atlas-B670-W	OK
E409104-05		2.34	117	1.0	1-6	Atlas-B670-N	Atlas-B670-N	OK
E409104-06		2.34	117	1.0	1-7	Atlas-B007-N	Atlas-B007-N	OK
E409104-07		2.27	113	1.0	1-8	Atlas-B007-S	Atlas-B007-S	OK
E409104-08		2.27	113	1.0	1-9	Atlas-B539-N	Atlas-B539-N	OK
E409104-09		2.35	117	1.0	1-10	Atlas-B539-E	Atlas-B539-E	OK
E409104-10		2.34	117	1.0	1-11	Atlas-B539-S	Atlas-B539-S	OK
E409104-11		2.31	116	1.0	1-12	Atlas-B539-W	Atlas-B539-W	OK
E409104-12		2.32	116	1.0	2-1	Atlas-B689-S1	Atlas-B689-S1	OK
E409104-13		3.70	185	1.0	2-2	Atlas-B689-S2	Atlas-B689-S2	OK
E409104-14		2.33	116	1.0	2-3	Atlas-B689-W2	Atlas-B689-W2	OK
E409104-15		2.28	114	1.0	2-4	Atlas-B689-W3	Atlas-B689-W3	OK
E409104-16		2.31	116	1.0	2-5	Atlas-B689-N	Atlas-B689-N	OK
E409104-02		2.38	24	5.0	1-3	Atlas-B676-S	Atlas-B676-S-df5	OK
BLANK-50cc		1.00	50	1.0	1-1	BLANK3	BLANK3	OK
EJ40206-BLK2		1.00	1000	0.1	1-1	BLANK-1000cc	BLANK-1000cc	OK
E409127-03		1.37	1370	0.1	1-1	TERRA-IA-17	TERRA-IA-17	OK

Analyst Signature: CS Parsons

H and P Mobile GeoChemistry

Analyst Signature

H and P Mobile GeoChemistry

GCMS # 9 INTERNAL STANDARD SUMMARY LOG FOR 10/02/2014

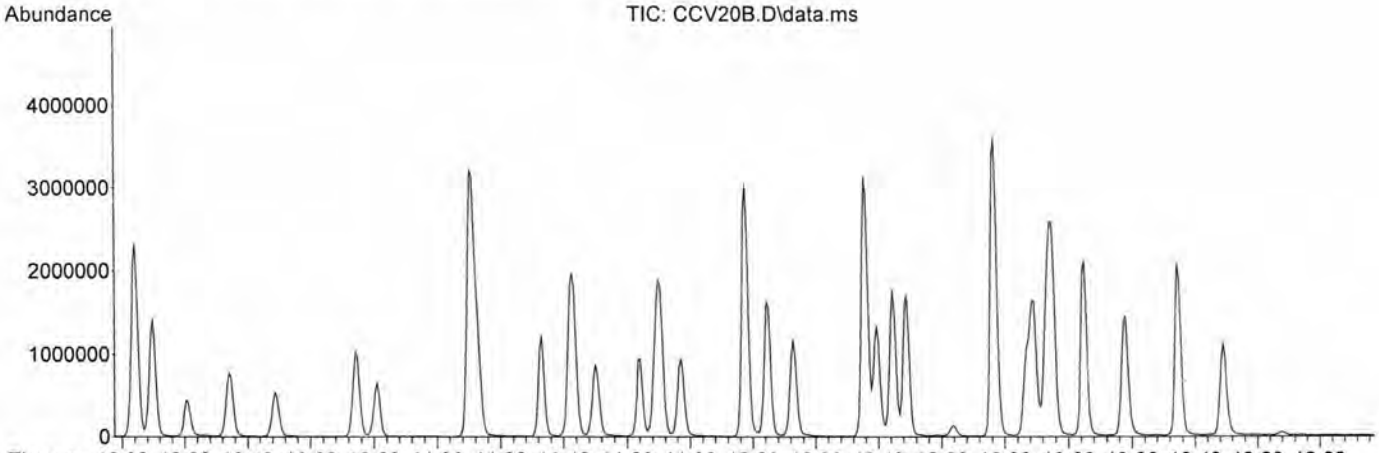
Method File Name: 091514ppbV

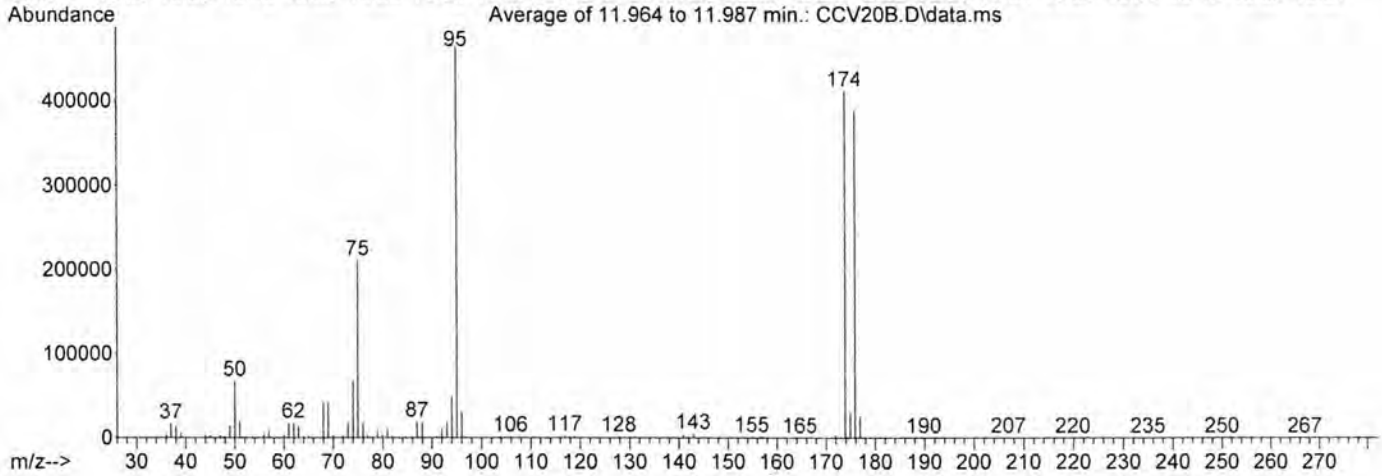
Client sample name	Sample Name	Bromochloromethane R.T.	Bromochloromethane Response	1,4-Difluorobenzene R.T.	1,4-Difluorobenzene Response	Chlorobenzene-d5 R.T.	Chlorobenzene-d5 Response	
CCV20B.D	CCV2	7.36	366188	8.59	1390770	11.10	204915	
BLANK1.D	BLANK-50cc	7.35	350279	8.59	1269189	11.10	194543	
LCS.D	LCS	7.35	365363	8.59	1401439	11.10	205956	
LCSD.D	LCSD	7.35	382375	8.59	1471599	11.10	214096	
Atlas-B665-S.D	E409104-01	7.36	373059	8.59	1417266	11.10	227359	
Atlas-B676-S.D	E409104-02	7.37	387716	8.59	1491094	11.10	343979	F
Atlas-B676-W.D	E409104-03	7.36	400502	8.59	1631642	11.10	274957	
Atlas-B670-W.D	E409104-04	7.37	406510	8.59	1587133	11.10	243019	
Atlas-B670-N.D	E409104-05	7.37	381891	8.59	1495128	11.10	236306	
Atlas-B007-N.D	E409104-06	7.35	383401	8.59	1448177	11.10	235475	
Atlas-B007-S.D	E409104-07	7.36	369780	8.59	1406275	11.10	220520	
Atlas-B539-N.D	E409104-08	7.35	378196	8.59	1484335	11.10	228203	
Atlas-B539-E.D	E409104-09	7.36	382793	8.59	1501508	11.10	228272	
Atlas-B539-S.D	E409104-10	7.36	385754	8.59	1453329	11.10	228159	
Atlas-B539-W.D	E409104-11	7.36	369229	8.59	1338101	11.10	213849	
Atlas-B689-S1.D	E409104-12	7.35	363494	8.59	1370773	11.10	223444	
Atlas-B689-W3.D	E409104-15	7.36	355018	8.59	1384957	11.10	219696	
Atlas-B689-N.D	E409104-16	7.36	388505	8.59	1525745	11.10	235149	
Atlas-B689-S2.D	E409104-13	7.35	367900	8.59	1419153	11.10	229656	
Atlas-B689-W2.D	E409104-14	7.36	354984	8.59	1338259	11.10	217189	
Atlas-B676-S-df5.D	E409104-02	7.37	373679	8.59	1357631	11.10	256112	
Acceptance Range Minimum	ICAL Average	7.02	223521	8.25	832505	10.77	128167	
Acceptance Range Maximum	ICAL Average	7.68	521549	8.91	1942513	11.43	299056	
*Acceptance Range Minimum	CCV	7.03	219713	8.26	834462	10.77	122949	
*Acceptance Range Maximum	CCV	7.69	512663	8.92	1947078	11.43	286881	

Data Path : C:\DATA\100214.1p\
Data File : CCV20B.D
Acq On : 2 Oct 2014 2:01 pm
Operator : CSP
Sample : CCV2
Misc : 1
ALS Vial : 2 Sample Multiplier: 1

Integration File: rteint.p

Method : C:\msdchem\1\METHODS\091514PPBV.M
Title : EPA TO-15 Analysis GC/MS #9
Last Update : Thu Oct 02 09:35:26 2014





Spectrum Information: Average of 11.964 to 11.987 min.

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	14.6	67670	PASS
75	95	30	66	45.6	211320	PASS
95	95	100	100	100.0	463616	PASS
96	95	5	9	6.6	30800	PASS
173	174	0.00	2	0.3	1092	PASS
174	95	50	120	88.6	410854	PASS
175	174	4	9	7.1	29357	PASS
176	174	93	101	94.1	386688	PASS
177	176	5	9	6.7	25745	PASS

Evaluate Continuing Calibration Report

Data Path : C:\DATA\100214.1p\
Data File : CCV20B.D
Acq On : 2 Oct 2014 2:01 pm
Operator : CSP
Sample : CCV2
Misc : 1
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Oct 03 08:31:01 2014
Quant Method : C:\msdchem\1\METHODS\091514PPBV.M
Quant Title : EPA TO-15 Analysis GC/MS #9
QLast Update : Thu Oct 02 09:35:26 2014
Response via : Initial Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	I	Bromochloromethane	1.000	1.000	0.0	99	0.00
2	T	1,1,1-Trifluoroethane	1.399	1.560	-11.5	112	0.00
3	T	1,1,1,2-Tetrafluoroethane	0.899	0.928	-3.2	104	0.00
4	TC	1,1 Difluoroethane	0.673	0.688	-2.2	103	0.00
5	TC	Propene	0.383	0.354	7.6	94	0.00
6	TC	Dichlorodifluoromethane	2.503	2.558	-2.2	104	0.00
7	TC	Chloromethane	0.633	0.643	-1.6	106	0.00
8	TC	Dichlorotetrafluoroethane	2.813	2.918	-3.7	104	0.00
9	TC	Vinyl Chloride	0.849	0.869	-2.4	103	0.00
10	TC	1,3-Butadiene	0.540	0.554	-2.6	103	0.00
11	TC	Bromomethane	1.028	1.077	-4.8	110	0.00
12	TC	Chloroethane	0.430	0.441	-2.6	104	0.00
13	TC	Ethanol	0.270	0.280	-3.7	99	0.00
14	TC	Trichlorofluoromethane	2.850	2.853	-0.1	103	0.00
15	TC	Acetone	0.335	0.368	-9.9	101	0.00
16	TC	Isopropyl Alcohol	0.993	1.045	-5.2	88	0.00
17	TC	1,1-Dichloroethene	1.129	1.332	-18.0	102	0.00
18	TC	tert-Butyl Alcohol	1.426	1.447	-1.5	92	0.00
19	TC	1,1,2-Trichlorotrifluoroeth	2.171	2.362	-8.8	109	0.00
20	TC	Methylene Chloride	0.911	0.892	2.1	107	0.00
21	TC	Carbon Disulfide	2.348	2.550	-8.6	108	0.00
22	TC	trans-1,2-Dichloroethene	1.021	0.973	4.7	97	0.00
23	TC	Methyl tert-Butyl Ether (MT	1.823	1.859	-2.0	99	0.00
24	TC	Vinyl Acetate	1.353	1.301	3.8	95	0.00
25	TC	1,1-Dichloroethane	1.470	1.565	-6.5	110	0.00
26	TC	2-Butanone	0.323	0.320	0.9	96	0.00
27	TC	n-Hexane	0.960	1.075	-12.0	111	0.00
28	TC	cis-1,2-Dichloroethene	0.909	0.843	7.3	98	0.00
29	TC	Di-isopropyl Ether	2.037	2.167	-6.4	104	0.00
30	TC	Ethyl Acetate	0.216	0.242	-12.0	103	0.00
31	TC	Chloroform	2.183	2.308	-5.7	109	0.00
32	TC	2,2-Dichloropropane	1.747	1.808	-3.5	108	0.00
33	TC	Tetrahydrofuran	0.332	0.344	-3.6	101	0.00
34	TC	Ethyl-tert-Butyl Ether	1.882	2.130	-13.2	105	0.00
35	S	1,2-Dichloroethane-d4	1.275	1.295	-1.6	101	0.00
36	TC	1,1,1-Trichloroethane	2.246	2.350	-4.6	108	0.00
37	TC	1,2-Dichloroethane	1.354	1.369	-1.1	106	0.00
38	TC	1,1-Dichloropropene	1.083	0.997	7.9	97	0.00
39	TC	Benzene	2.516	2.742	-9.0	108	0.00
40	TC	Carbon Tetrachloride	2.487	2.534	-1.9	105	0.00
41	TC	Cyclohexane	1.230	1.126	8.5	107	0.00
42	I	1,4-Difluorobenzene	1.000	1.000	0.0	100	0.00
43	TC	tert Amyl Methyl Ether (TAM	0.529	0.532	-0.6	104	0.00
44	TC	2,2,4-Trimethylpentane	0.861	0.962	-11.7	110	0.00
45	TC	n-Heptane	0.192	0.206	-7.3	105	0.00
46	TC	Trichloroethene	0.366	0.407	-11.2	108	0.00
47	TC	Dibromomethane	0.318	0.324	-1.9	108	0.00

Data Path : C:\DATA\100214.1p\
Data File : CCV20B.D
Acq On : 2 Oct 2014 2:01 pm
Operator : CSP
Sample : CCV2
Misc : 1
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Oct 03 08:31:01 2014
Quant Method : C:\msdchem\1\METHODS\091514PPBV.M
Quant Title : EPA TO-15 Analysis GC/MS #9
QLast Update : Thu Oct 02 09:35:26 2014
Response via : Initial Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
48	TC	1,2-Dichloropropane	0.227	0.248	-9.3	113	0.00
49	TC	1,4-Dioxane	0.151	0.152	-0.7	98	0.00
50	TC	Bromodichloromethane	0.615	0.639	-3.9	110	0.00
51	TC	cis-1,3-Dichloropropene	0.365	0.387	-6.0	104	0.00
52	TC	4-Methyl-2-pentanone	0.378	0.409	-8.2	101	0.00
53	TC	trans-1,3-Dichloropropene	0.365	0.387	-6.0	104	0.00
54	TC	1,3-Dichloropropane	0.456	0.481	-5.5	105	0.00
55	TC	Toluene	0.987	1.019	-3.2	106	0.00
56	S	Toluene-d8	0.917	0.915	0.2	101	0.00
57	TC	1,1,2-Trichloroethane	0.354	0.368	-4.0	110	0.00
58	TC	2-Hexanone	0.224	0.207	7.6	91	0.00
59	TC	Dibromochloromethane	0.704	0.699	0.7	102	0.00
60	TC	Tetrachloroethene	0.532	0.491	7.7	95	0.00
61	TC	1,2-Dibromoethane	0.558	0.555	0.5	102	0.00
62	I	Chlorobenzene-d5	1.000	1.000	0.0	97	0.00
63	TC	1,1,1,2-Tetrachloroethane	3.589	3.606	-0.5	102	0.00
64	TC	Chlorobenzene	6.142	6.056	1.4	100	0.00
65	TC	Ethylbenzene	7.425	8.196	-10.4	98	0.00
66	TC	m,p-Xylene	6.329	7.588	-19.9	102	0.00
67	TC	Styrene	4.623	4.753	-2.8	92	0.00
68	TC	o-Xylene	6.858	7.991	-16.5	101	0.00
69	TC	Bromoform	4.750	4.620	2.7	96	0.00
70	TC	1,1,2,2-Tetrachloroethane	5.725	6.276	-9.6	108	0.00
71	S	4-Bromofluorobenzene	4.187	4.385	-4.7	101	0.00
72	TC	1,2,3-Trichloropropane	4.344	4.555	-4.9	102	0.00
73	TC	Isopropylbenzene	10.516	11.364	-8.1	99	0.00
74	TC	Bromobenzene	4.103	3.998	2.6	93	0.00
75	TC	2-Chlorotoluene	2.983	3.308	-10.9	99	0.00
76	TC	4-Chlorotoluene	2.975	2.942	1.1	89	0.00
77	TC	n-Propylbenzene	19.340	23.170	-19.8	97	0.00
78	TC	4-Ethyltoluene	10.425	11.845	-13.6	98	0.00
79	TC	1,3,5-Trimethylbenzene	9.134	10.247	-12.2	99	0.00
80	TC	tert-Butylbenzene	10.307	11.600	-12.5	97	0.00
81	TC	1,2,4-Trimethylbenzene	9.415	10.570	-12.3	96	0.00
82	TC	1,3-Dichlorobenzene	8.044	8.116	-0.9	91	0.00
83	TC	Benzyl Chloride	7.748	7.651	1.3	90	0.00
84	TC	1,4-Dichlorobenzene	7.933	7.785	1.9	91	0.00
85	TC	sec-Butylbenzene	13.513	15.521	-14.9	100	0.00
86	TC	p-Isopropyltoluene	11.902	13.116	-10.2	93	0.00
87	TC	1,2-Dichlorobenzene	7.585	7.382	2.7	89	0.00
88	TC	n-Butylbenzene	10.537	11.925	-13.2	94	0.00
89	TC	1,2-Dibromo-3-Chloropropane	3.481	3.262	6.3	87	0.00
90	TC	Naphthalene	14.291	11.302	20.9	64	0.00
91	TC	1,2,4-Trichlorobenzene	6.555	5.991	8.6	75	0.00
92	TC	1,2,3-Trichlorobenzene	6.820	6.309	7.5	77	0.00
93	TC	Hexachlorobutadiene	6.412	6.471	-0.9	96	0.00

Evaluate Continuing Calibration Report

Data Path : C:\DATA\100214.1p\
Data File : CCV20B.D
Acq On : 2 Oct 2014 2:01 pm
Operator : CSP
Sample : CCV2
Misc : 1
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Oct 03 08:31:01 2014
Quant Method : C:\msdchem\1\METHODS\091514PPBV.M
Quant Title : EPA TO-15 Analysis GC/MS #9
QLast Update : Thu Oct 02 09:35:26 2014
Response via : Initial Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Appendix C
Data Validation Report and Puerto Rican Chemist Certification

Maryland Office
8600 Snowden River Parkway
Suite 300
Columbia, MD 21045
410-312-3535 office
410-312-3544 fax

Virginia Office
402 North West Street
Culpeper, Virginia 22701
540-829-5642 Office
540-829-5641 Fax

DATA CERTIFICATION

The attached laboratory report AG092214-14 consisting of 38 pages, has been certified by Janis Villarreal, Laboratory Director, H&P Mobile Geochemistry, Inc. The analyses contained herein was performed and reviewed in compliance with their Quality Systems Manual and Standard Operating Procedures.

I hereby certify that this laboratory report and associated documentation has been reviewed and approved.

Ralph Abbondanza, REM
Vice President, Special Projects
PR Chemist's License #3803

Data Validation Completeness Worksheet
Level II

Site:	Fort Buchanan, PR	Date:	10/22/2014
SDG#:	AG092214-14	Page	1 of 3
Lab:	H&P Mobile Geochemistry	Reviewer:	Jessica Kelso
		2nd Reviewer:	

Method: VOCs by TO-15

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area	Code	Comments	Qualifier
I	Case Narrative	A		
II	Sample Receipt Documentation	A		
III	Technical Hold Times	A		
IV	Blanks	SW	Methylene chloride was detected in the method blank at a concentration > LOD and < LOQ. Field sample have been qualified in accordance with the NFGs. If the field sample concentration is < LOQ and < 10X the method blank, the concentration is qualified < LOQ U. If the concentration is > LOQ but < 10X the method blank, the concentration is qualified as nondetect at the concentration reported. If the concentration is > 10X the method blank, the data is not qualified.	See table below.
V	Surrogates	A		
VI	Matrix Spike/Matrix Spike Dup.	NA		
VII	Laboratory Control Samples	A		
VIII	Field Blanks	NA		
IX	Field Duplicates	SW	Two field duplicate pairs were submitted with this work order FTB034-VI-B007-S-09172014/FTB034-VI-B689-W2-09172014 and FTB034-VI-B007-N-09172014/FTB034-VI-B689-S1-09172014. Acetone was qualified as an estimate in the first pair due to poor replicate precision.	J
X	Overall Assessment of the Data	SW	**All data reported are usuable. No data were rejected. Data qualified due to QC deficiencies are presented in the table below.**	

Codes: A = Acceptable
NA = Not provided/applicable
SW = See Worksheet
ND = No compounds detected
R = Rinsate
FB = Field Blank
D = Duplicate
TB = Trip Blank
EB = Equipment Blank

Validated Samples:

Sample ID	Q	Sample ID	Q	Sample ID	Q
FTB034-VI-B665-S-09172014	methylene chloride < 3.5 U				
FTB034-VI-B676-S-09172014	methylene chloride < 18 U				
FTB034-VI-B676-W-09172014					
FTB034-VI-B670-W-09172014	methylene chloride < 3.5 U				
FTB034-VI-B670-N-09172014	methylene chloride < 6.8 U				
FTB034-VI-B007-N-09172014	methylene chloride < 9.0 U				
FTB034-VI-B007-S-09172014	methylene chloride < 3.5 U	acetone - J			
FTB034-VI-B539-N-09172014	methylene chloride < 3.5 U				
FTB034-VI-B539-E-09172014	methylene chloride < 3.5 U				
FTB034-VI-B539-S-09172014	methylene chloride < 3.5 U				
FTB034-VI-B539-W-09172014	methylene chloride < 4.6 U				
FTB034-VI-B689-S1-09172014	methylene chloride < 11 U				
FTB034-VI-B689-S2-09172014	methylene chloride < 6.2 U				
FTB034-VI-B689-W2-09172014	methylene chloride < 3.6 U	acetone - J			
FTB034-VI-B689-W3-09172014	methylene chloride < 3.6 U				
FTB034-VI-B689-N-09172014	methylene chloride < 3.6 U				

SDG #	AG092214-14	Laboratory:	H&P Mobile Geochemistry	Validator:	Jessica Kelso	Validation Date:	10/22/2014
Site:	Ft. Buchanan	AR/COC#	N/A	Sample Receipt Docs Present:	Yes	Validation Level:	II
Matrix:	Air	# of Samples:	16	Case Narrative Present:	Yes	Page	2 of 3
COCs present:	Yes	COCs signed:	Yes	COCs dated:	Yes	Sample Container Integrity:	Acceptable
Analysis:	VOCs by TO-15						

Requested Analyses Not Reported			
Client Sample ID	**Lab Sample ID**	**Analysis**	**Comments**
None			

Hold Time/Preservation Outliers						
Client Sample ID	Lab Sample ID	Analysis	Preservation	Collection Date	Preparation Date	Analysis Date
None						

Comments: Samples were collected on September 17, 2014. Samples were received at the lab on September 22, 2014 and were prepped on October 2nd and analyzed on October 3rd.

SDG:	AG09214-14	Method:	TO-15	Matrix:	Air	Laboratory Sample IDs:	E409104-01 through E409104-16
Batch #s:	EJ40206						

Analyte (outliers)	Method Blank	< 10X MB	LCS %R	LCSD %R	LCS/LCSD RPD	MS% R (-)	MSD% R	MS/MSD RPD	FD RPD (-07/-14)	QC Rinse Blank	Field Blank	Trip Blank	
Methylene chloride	2.4												
FTB034-VI-B665-S-09172014		X											
FTB034-VI-B676-S-09172014		X											
FTB034-VI-B676-W-09172014													
FTB034-VI-B670-W-09172014		X											
FTB034-VI-B670-N-09172014		X											
FTB034-VI-B007-N-09172014		X											
FTB034-VI-B007-S-09172014		X											
FTB034-VI-B539-N-09172014		X											
FTB034-VI-B539-E-09172014		X											
FTB034-VI-B539-S-09172014		X											
FTB034-VI-B539-W-09172014		X											
FTB034-VI-B689-S1-09172014		X											
FTB034-VI-B689-S2-09172014		X											
FTB034-VI-B689-W2-09172014		X											
FTB034-VI-B689-W3-09172014		X											
FTB034-VI-B689-N-09172014		X											
Acetone									97%				

Surrogate/Tracer Outliers for 8260B

DoD Limits (lab criteria); (1,2-DCE-d4: 76-134%; 4-BFB: 77-127%; Toluene-d8: 78-125%)

Sample ID	1,2-DCE-d4	4-BFB	Toluene-d8											
None														

Comments:

A = Acceptable
NA = Not Applicable

Appendix D
VISL Print Outs

VISL - Calculator - COPC list 10-6

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (^{o}C)	Tgw	25	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
			Cvp > Cia,target?	Chc > Cia,target?	MIN(Cia,c;Cia,nc)		Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL		IUR		RfC		i	Cia,c	Cia,nc
			Yes/No	Yes/No	(ug/m^3)	C/NC	(ug/m^3)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)		(ug/m^3)$^{-1}$		(mg/m^3)			(ug/m^3)	(ug/m^3)
	75-07-0	Acetaldehyde	Yes	Yes	5.6E+00	C	5.6E+01	2.0E+03	--	25	4	E	2.20E-06	I	9.00E-03	I		5.6E+00	3.9E+01
	67-64-1	Acetone	Yes	Yes	1.4E+05	NC	1.4E+06	9.5E+07	--	25	2.6	E			3.10E+01	A			1.4E+05
	75-86-5	Acetone Cyanohydrin	Yes	Yes	8.8E+00	NC	8.8E+01	1.6E+04	--	25					2.00E-03	X			8.8E+00
	75-05-8	Acetonitrile	Yes	Yes	2.6E+02	NC	2.6E+03	1.9E+05	--	25	3	N			6.00E-02	I			2.6E+02
	107-02-8	Acrolein	Yes	Yes	8.8E-02	NC	8.8E-01	1.8E+01	--	25	2.8	N			2.00E-05	I			8.8E-02
	107-13-1	Acrylonitrile	Yes	Yes	1.8E-01	C	1.8E+00	3.2E+01	--	25	3	N	6.80E-05	I	2.00E-03	I		1.8E-01	8.8E+00
	107-05-1	Allyl Chloride	Yes	Yes	2.0E+00	C	2.0E+01	4.5E+00	--	25			6.00E-06	CA	1.00E-03	I		2.0E+00	4.4E+00
	75-85-4	Amyl Alcohol, tert-	Yes	Yes	1.3E+01	NC	1.3E+02	2.3E+04	--	25	1.3	M			3.00E-03	X			1.3E+01
	11104-28-2	Aroclor 1221	Yes	Yes	2.2E-02	C	2.2E-01	7.2E-01	--	25			5.70E-04	S				2.2E-02	
	11141-16-5	Aroclor 1232	Yes	Yes	2.2E-02	C	2.2E-01	7.2E-01	--	25			5.70E-04	S				2.2E-02	
	103-33-3	Azobenzene	Yes	Yes	4.0E-01	C	4.0E+00	7.2E+02	--	25			3.10E-05	I				4.0E-01	
x	71-43-2	Benzene	Yes	Yes	1.6E+00	C	1.6E+01	6.9E+00	No (5)	25	1.2	N	7.80E-06	I	3.00E-02	I		1.6E+00	1.3E+02
	100-44-7	Benzyl Chloride	Yes	Yes	2.5E-01	C	2.5E+00	1.5E+01	--	25	1.1	N	4.90E-05	CA	1.00E-03	P		2.5E-01	4.4E+00
	92-52-4	Biphenyl, 1,1'-	Yes	Yes	1.8E+00	NC	1.8E+01	1.4E+02	--	25	0.6	N			4.00E-04	X			1.8E+00
	108-60-1	Bis(2-chloro-1-methylethyl) ether	Yes	Yes	1.2E+00	C	1.2E+01	4.0E+02	--	25			1.00E-05	H				1.2E+00	
	111-44-4	Bis(2-chloroethyl)ether	Yes	Yes	3.7E-02	C	3.7E-01	5.3E+01	--	25	2.7	N	3.30E-04	I				3.7E-02	
	542-88-1	Bis(chloromethyl)ether	Yes	Yes	2.0E-04	C	2.0E-03	1.1E-03	--	25			6.20E-02	I				2.0E-04	
	107-04-0	Bromo-2-chloroethane, 1-	Yes	Yes	2.0E-02	C	2.0E-01	5.5E-01	--	25			6.00E-04	X				2.0E-02	
	108-86-1	Bromobenzene	Yes	Yes	2.6E+02	NC	2.6E+03	2.6E+03	--	25					6.00E-02	I			2.6E+02
	74-97-5	Bromochloromethane	Yes	Yes	1.8E+02	NC	1.8E+03	2.9E+03	--	25					4.00E-02	X			1.8E+02
x	75-27-4	Bromodichloromethane	Yes	Yes	3.3E-01	C	3.3E+00	3.8E+00	Yes (80)	25			3.70E-05	CA				3.3E-01	
	74-83-9	Bromomethane	Yes	Yes	2.2E+01	NC	2.2E+02	7.3E+01	--	25	10	N			5.00E-03	I			2.2E+01
	106-99-0	Butadiene, 1,3-	Yes	Yes	4.1E-01	C	4.1E+00	1.4E-01	--	25	2	N	3.00E-05	I	2.00E-03	I		4.1E-01	8.8E+00
	75-15-0	Carbon Disulfide	Yes	Yes	3.1E+03	NC	3.1E+04	5.2E+03	--	25	1.3	N			7.00E-01	I			3.1E+03
	56-23-5	Carbon Tetrachloride	Yes	Yes	2.0E+00	C	2.0E+01	1.8E+00	Yes (5)	25			6.00E-06	I	1.00E-01	I		2.0E+00	4.4E+02
	75-68-3	Chloro-1,1-difluoroethane, 1-	Yes	Yes	2.2E+05	NC	2.2E+06	9.1E+04	--	25					5.00E+01	I			2.2E+05
	126-99-8	Chloro-1,3-butadiene, 2-	Yes	Yes	4.1E-02	C	4.1E-01	1.8E-02	--	25	1.9	N	3.00E-04	I	2.00E-02	I		4.1E-02	8.8E+01
	108-90-7	Chlorobenzene	Yes	Yes	2.2E+02	NC	2.2E+03	1.7E+03	No (100)	25	1.3	N			5.00E-02	P			2.2E+02
	98-56-6	Chlorobenzotrifluoride, 4-	Yes	Yes	1.3E+03	NC	1.3E+04	9.3E+02	--	25					3.00E-01	P			1.3E+03
	75-45-6	Chlorodifluoromethane	Yes	Yes	2.2E+05	NC	2.2E+06	1.3E+05	--	25					5.00E+01	I			2.2E+05
x	67-66-3	Chloroform	Yes	Yes	5.3E-01	C	5.3E+00	3.6E+00	Yes (80)	25			2.30E-05	I	9.80E-02	A		5.3E-01	4.3E+02
	74-87-3	Chloromethane	Yes	Yes	3.9E+02	NC	3.9E+03	1.1E+03	--	25	8.1	N			9.00E-02	I			3.9E+02
	107-30-2	Chloromethyl Methyl Ether	Yes	Yes	1.8E-02	C	1.8E-01	1.4E+00	--	25			6.90E-04	CA				1.8E-02	
	76-06-2	Chloropicrin	Yes	Yes	1.8E+00	NC	1.8E+01	2.1E+01	--	25					4.00E-04	CA			1.8E+00
	98-82-8	Cumene	Yes	Yes	1.8E+03	NC	1.8E+04	3.7E+03	--	25	0.9	N			4.00E-01	I			1.8E+03
	57-12-5	Cyanide (CN-)	Yes	Yes	3.5E+00	NC	3.5E+01	6.4E+02	No (200)	25					8.00E-04	S			3.5E+00
	110-82-7	Cyclohexane	Yes	Yes	2.6E+04	NC	2.6E+05	4.3E+03	--	25					6.00E+00	I			2.6E+04
	110-83-8	Cyclohexene	Yes	Yes	4.4E+03	NC	4.4E+04	2.4E+03	--	25					1.00E+00	X			4.4E+03
	96-12-8	Dibromo-3-chloropropane, 1,2-	Yes	Yes	2.0E-03	C	2.0E-02	3.4E-01	No (0.2)	25			6.00E-03	P	2.00E-04	I	Mut	2.0E-03	8.8E-01
	124-48-1	Dibromochloromethane	Yes	Yes	4.5E-01	C	4.5E+00	1.4E+01	Yes (80)	25			2.70E-05	CA				4.5E-01	
	106-93-4	Dibromoethane, 1,2-	Yes	Yes	2.0E-02	C	2.0E-01	7.7E-01	No (0.05)	25			6.00E-04	I	9.00E-03	I		2.0E-02	3.9E+01
	74-95-3	Dibromomethane (Methylene Bromide)	Yes	Yes	1.8E+01	NC	1.8E+02	5.2E+02	--	25					4.00E-03	X			1.8E+01
	764-41-0	Dichloro-2-butene, 1,4-	Yes	Yes	2.9E-03	C	2.9E-02	1.1E-01	--	25			4.20E-03	P				2.9E-03	
	1476-11-5	Dichloro-2-butene, cis-1,4-	Yes	Yes	2.9E-03	C	2.9E-02	1.1E-01	--	25			4.20E-03	P				2.9E-03	
	110-57-6	Dichloro-2-butene, trans-1,4-	Yes	Yes	2.9E-03	C	2.9E-02	1.1E-01	--	25			4.20E-03	P				2.9E-03	
	95-50-1	Dichlorobenzene, 1,2-	Yes	Yes	8.8E+02	NC	8.8E+03	1.1E+04	No (600)	25	2.2	N			2.00E-01	H			8.8E+02
	106-46-7	Dichlorobenzene, 1,4-	Yes	Yes	1.1E+00	C	1.1E+01	1.1E+01	Yes (75)	25	2.5	N	1.10E-05	CA	8.00E-01	I		1.1E+00	3.5E+03
	75-71-8	Dichlorodifluoromethane	Yes	Yes	4.4E+02	NC	4.4E+03	3.1E+01	--	25					1.00E-01	X			4.4E+02
	75-34-3	Dichloroethane, 1,1-	Yes	Yes	7.7E+00	C	7.7E+01	3.3E+01	--	25	5.4	N	1.60E-06	CA				7.7E+00	
	107-06-2	Dichloroethane, 1,2-	Yes	Yes	4.7E-01	C	4.7E+00	9.8E+00	No (5)	25	6.2	N	2.60E-05	I	7.00E-03	P		4.7E-01	3.1E+01
	75-35-4	Dichloroethylene, 1,1-	Yes	Yes	8.8E+02	NC	8.8E+03	8.2E+02	No (7)	25	6.5	N			2.00E-01	I			8.8E+02
	78-87-5	Dichloropropane, 1,2-	Yes	Yes	1.2E+00	C	1.2E+01	1.1E+01	No (5)	25	3.4	N	1.00E-05	CA	4.00E-03	I		1.2E+00	1.8E+01
	542-75-6	Dichloropropene, 1,3-	Yes	Yes	3.1E+00	C	3.1E+01	2.1E+01	--	25	5.3	N	4.00E-06	I	2.00E-02	I		3.1E+00	8.8E+01
	77-73-6	Dicyclopentadiene	Yes	Yes	1.3E+00	NC	1.3E+01	5.1E-01	--	25					3.00E-04	X			1.3E+00
	75-37-6	Difluoroethane, 1,1-	Yes	Yes	1.8E+05	NC	1.8E+06	2.1E+05	--	25					4.00E+01	I			1.8E+05

VISL - Calculator - COPC list 10-6

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	25	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source	Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
			Cvp > Cia,target?	Chc > Cia,target?	MIN(Cia,c;Cia,nc)		Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL		IUR		RfC		i	Cia,c	Cia,nc
			Yes/No	Yes/No	(ug/m^3)	C/NC	(ug/m^3)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)		(ug/m^3)$^{-1}$		(mg/m^3)			(ug/m^3)	(ug/m^3)
	94-58-6	Dihydrosafrole	Yes	Yes	9.4E-01	C	9.4E+00	1.4E-01	--	25			1.30E-05	CA				9.4E-01	
	108-20-3	Diisopropyl Ether	Yes	Yes	3.1E+03	NC	3.1E+04	2.9E+04	--	25					7.00E-01	P			3.1E+03
	513-37-1	Dimethylvinylchloride	Yes	Yes	9.4E-01	C	9.4E+00	2.8E-01	--	25			1.30E-05	CA				9.4E-01	
	106-89-8	Epichlorohydrin	Yes	Yes	4.4E+00	NC	4.4E+01	3.5E+03	--	25	3.8	N	1.20E-06	I	1.00E-03	I		1.0E+01	4.4E+00
	106-88-7	Epoxybutane, 1,2-	Yes	Yes	8.8E+01	NC	8.8E+02	1.2E+04	--	25					2.00E-02	I			8.8E+01
	141-78-6	Ethyl Acetate	Yes	Yes	3.1E+02	NC	3.1E+03	5.6E+04	--	25	2	N			7.00E-02	P			3.1E+02
	75-00-3	Ethyl Chloride (Chloroethane)	Yes	Yes	4.4E+04	NC	4.4E+05	9.7E+04	--	25	3.8	N			1.00E+01	I			4.4E+04
	97-63-2	Ethyl Methacrylate	Yes	Yes	1.3E+03	NC	1.3E+04	5.6E+04	--	25	1.8	M			3.00E-01	P			1.3E+03
x	100-41-4	Ethylbenzene	Yes	Yes	4.9E+00	C	4.9E+01	1.5E+01	Yes (700)	25	0.8	N	2.50E-06	CA	1.00E+00	I		4.9E+00	4.4E+03
	75-21-8	Ethylene Oxide	Yes	Yes	1.4E-01	C	1.4E+00	2.3E+01	--	25	3	N	8.80E-05	CA	3.00E-02	CA		1.4E-01	1.3E+02
	151-56-4	Ethyleneimine	Yes	Yes	6.5E-04	C	6.5E-03	1.3E+00	--	25	3.3	N	1.90E-02	CA				6.5E-04	
	822-06-0	Hexamethylene Diisocyanate, 1,6-	Yes	Yes	4.4E-02	NC	4.4E-01	2.2E+01	--	25					1.00E-05	I			4.4E-02
	110-54-3	Hexane, N-	Yes	Yes	3.1E+03	NC	3.1E+04	4.2E+01	--	25	1.1	N			7.00E-01	I			3.1E+03
	591-78-6	Hexanone, 2-	Yes	Yes	1.3E+02	NC	1.3E+03	3.4E+04	--	25					3.00E-02	I			1.3E+02
	74-90-8	Hydrogen Cyanide	Yes	Yes	3.5E+00	NC	3.5E+01	6.4E+02	--	25	5.6	N			8.00E-04	I			3.5E+00
	7439-97-6	Mercury (elemental)	Yes	Yes	1.3E+00	NC	1.3E+01	2.8E+00	No (2)	25					3.00E-04	I			1.3E+00
	126-98-7	Methacrylonitrile	Yes	Yes	1.3E+02	NC	1.3E+03	1.3E+04	--	25	2	N			3.00E-02	P			1.3E+02
	96-33-3	Methyl Acrylate	Yes	Yes	8.8E+01	NC	8.8E+02	1.1E+04	--	25	2.8	N			2.00E-02	P			8.8E+01
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	Yes	Yes	2.2E+04	NC	2.2E+05	9.4E+06	--	25	1.4	N			5.00E+00	I			2.2E+04
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	Yes	Yes	1.3E+04	NC	1.3E+05	2.3E+06	--	25	1.2	N			3.00E+00	I			1.3E+04
	624-83-9	Methyl Isocyanate	Yes	Yes	4.4E+00	NC	4.4E+01	1.2E+02	--	25	5.3	N			1.00E-03	CA			4.4E+00
	80-62-6	Methyl Methacrylate	Yes	Yes	3.1E+03	NC	3.1E+04	2.4E+05	--	25	1.7	N			7.00E-01	I			3.1E+03
	25013-15-4	Methyl Styrene (Mixed Isomers)	Yes	Yes	1.8E+02	NC	1.8E+03	1.4E+03	--	25					4.00E-02	H			1.8E+02
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	Yes	Yes	4.7E+01	C	4.7E+02	2.0E+03	--	25	1.6	M	2.60E-07	CA	3.00E+00	I		4.7E+01	1.3E+04
	75-09-2	Methylene Chloride	Yes	Yes	1.2E+03	C	1.2E+04	9.2E+03	No (5)	25	13	N	1.00E-08	I	6.00E-01	I	Mut	1.2E+03	2.6E+03
	91-20-3	Naphthalene	Yes	Yes	3.6E-01	C	3.6E+00	2.0E+01	--	25	0.9	N	3.40E-05	CA	3.00E-03	I		3.6E-01	1.3E+01
	98-95-3	Nitrobenzene	Yes	Yes	3.1E-01	C	3.1E+00	3.1E+02	--	25	1.8	N	4.00E-05	I	9.00E-03	I		3.1E-01	3.9E+01
	75-52-5	Nitromethane	Yes	Yes	1.4E+00	C	1.4E+01	1.2E+03	--	25			8.80E-06	P	5.00E-03	P		1.4E+00	2.2E+01
	79-46-9	Nitropropane, 2-	Yes	Yes	4.5E-03	C	4.5E-02	9.3E-01	--	25	2.6	N	2.70E-03	H	2.00E-02	I		4.5E-03	8.8E+01
	924-16-3	Nitroso-di-N-butylamine, N-	Yes	Yes	7.7E-03	C	7.7E-02	1.4E+01	--	25			1.60E-03	I				7.7E-03	
	111-84-2	Nonane, n-	Yes	Yes	8.8E+01	NC	8.8E+02	6.3E-01	--	25					2.00E-02	P			8.8E+01
	109-66-0	Pentane, n-	Yes	Yes	4.4E+03	NC	4.4E+04	8.6E+01	--	25					1.00E+00	P			4.4E+03
	75-44-5	Phosgene	Yes	Yes	1.3E+00	NC	1.3E+01	1.9E+00	--	25					3.00E-04	I			1.3E+00
	123-38-6	Propionaldehyde	Yes	Yes	3.5E+01	NC	3.5E+02	1.2E+04	--	25					8.00E-03	I			3.5E+01
	103-65-1	Propyl benzene	Yes	Yes	4.4E+03	NC	4.4E+04	1.0E+04	--	25	0.8	M			1.00E+00	X			4.4E+03
	115-07-1	Propylene	Yes	Yes	1.3E+04	NC	1.3E+05	1.6E+03	--	25	2	E			3.00E+00	CA			1.3E+04
	75-56-9	Propylene Oxide	Yes	Yes	3.3E+00	C	3.3E+01	1.2E+03	--	25			3.70E-06	I	3.00E-02	I		3.3E+00	1.3E+02
	100-42-5	Styrene	Yes	Yes	4.4E+03	NC	4.4E+04	3.9E+04	No (100)	25	1.1	E			1.00E+00	I			4.4E+03
	630-20-6	Tetrachloroethane, 1,1,1,2-	Yes	Yes	1.7E+00	C	1.7E+01	1.6E+01	--	25			7.40E-06	I				1.7E+00	
	79-34-5	Tetrachloroethane, 1,1,2,2-	Yes	Yes	2.1E-01	C	2.1E+00	1.4E+01	--	25			5.80E-05	CA				2.1E-01	
	127-18-4	Tetrachloroethylene	Yes	Yes	4.7E+01	C	4.7E+02	6.5E+01	No (5)	25			2.60E-07	I	4.00E-02	I		4.7E+01	1.8E+02
	811-97-2	Tetrafluoroethane, 1,1,1,2-	Yes	Yes	3.5E+05	NC	3.5E+06	1.7E+05	--	25					8.00E+01	I			3.5E+05
	109-99-9	Tetrahydrofuran	Yes	Yes	8.8E+03	NC	8.8E+04	3.0E+06	--	25	2	N			2.00E+00	I			8.8E+03
	108-88-3	Toluene	Yes	Yes	2.2E+04	NC	2.2E+05	8.1E+04	No (1000)	25	1.1	N			5.00E+00	I			2.2E+04
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	Yes	Yes	1.3E+05	NC	1.3E+06	6.1E+03	--	25					3.00E+01	H			1.3E+05
	120-82-1	Trichlorobenzene, 1,2,4-	Yes	Yes	8.8E+00	NC	8.8E+01	1.5E+02	No (70)	25	2.5	N			2.00E-03	P			8.8E+00
	71-55-6	Trichloroethane, 1,1,1-	Yes	Yes	2.2E+04	NC	2.2E+05	3.1E+04	No (200)	25	7.5	N			5.00E+00	I			2.2E+04
	79-00-5	Trichloroethane, 1,1,2-	Yes	Yes	7.7E-01	C	7.7E+00	2.3E+01	No (5)	25	6	N	1.60E-05	I	2.00E-04	X		7.7E-01	8.8E-01
	79-01-6	Trichloroethylene	Yes	Yes	3.0E+00	C	3.0E+01	7.4E+00	No (5)	25	8	N	see note	I	2.00E-03	I	TCE	3.0E+00	8.8E+00
	75-69-4	Trichlorofluoromethane	Yes	Yes	3.1E+03	NC	3.1E+04	7.7E+02	--	25					7.00E-01	H			3.1E+03
	96-18-4	Trichloropropane, 1,2,3-	Yes	Yes	1.3E+00	NC	1.3E+01	9.4E+01	--	25	3.2	N			3.00E-04	I	Mut		1.3E+00
	96-19-5	Trichloropropene, 1,2,3-	Yes	Yes	1.3E+00	NC	1.3E+01	1.8E+00	--	25					3.00E-04	P			1.3E+00
	121-44-8	Triethylamine	Yes	Yes	3.1E+01	NC	3.1E+02	5.0E+03	--	25					7.00E-03	I			3.1E+01
	526-73-8	Trimethylbenzene, 1,2,3-	Yes	Yes	2.2E+01	NC	2.2E+02	1.2E+02	--	25					5.00E-03	P			2.2E+01
	95-63-6	Trimethylbenzene, 1,2,4-	Yes	Yes	3.1E+01	NC	3.1E+02	1.2E+02	--	25	0.9	N			7.00E-03	P			3.1E+01

VISL - Calculator - COPC list 10-6

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (^{o}C)	Tgw	25	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source	Inhalation Unit Risk	IUR Source*	Reference Concentration	RfC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
		Cvp > Cia,target?	Chc > Cia,target?	MIN(Cia,c;Cia,nc)		Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL		IUR		RfC		i	Cia,c	Cia,nc
		Yes/No	Yes/No	(ug/m^3)	C/NC	(ug/m^3)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)		(ug/m^3)$^{-1}$		(mg/m^3)			(ug/m^3)	(ug/m^3)
108-05-4	Vinyl Acetate	Yes	Yes	8.8E+02	NC	8.8E+03	4.2E+04	--	25	2.6	N			2.00E-01	I			8.8E+02
593-60-2	Vinyl Bromide	Yes	Yes	3.8E-01	C	3.8E+00	7.6E-01	--	25			3.20E-05	H	3.00E-03	I		3.8E-01	1.3E+01
75-01-4	Vinyl Chloride	Yes	Yes	2.8E+00	C	2.8E+01	2.5E+00	No (2)	25	3.6	N	4.40E-06	I	1.00E-01	I	VC	2.8E+00	4.4E+02
108-38-3	Xylene, m-	Yes	Yes	4.4E+02	NC	4.4E+03	1.5E+03	--	25	1.1	N			1.00E-01	S			4.4E+02
95-47-6	Xylene, o-	Yes	Yes	4.4E+02	NC	4.4E+03	2.1E+03	--	25	0.9	N			1.00E-01	S			4.4E+02
106-42-3	Xylene, P-	Yes	Yes	4.4E+02	NC	4.4E+03	1.6E+03	--	25	1	N			1.00E-01	S			4.4E+02
1330-20-7	Xylenes	Yes	Yes	4.4E+02	NC	4.4E+03	2.1E+03	Yes (10000)	25					1.00E-01	I			4.4E+02

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell E5) Symbol	Selected Value
Averaging time for carcinogens	(yrs)	ATc_R	70	ATc_C	70	ATc	70
Averaging time for non-carcinogens	(yrs)	ATnc_R	26	ATnc_C	25	ATnc	25
Exposure duration	(yrs)	ED_R	26	ED_C	25	ED	25
Exposure frequency	(days/yr)	EF_R	350	EF_C	250	EF	250
Exposure time	(hr/day)	ET_R	24	ET_C	8	ET	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell E5) Symbol	Selected Value
Groundwater	(-)	AFgw_R	0.001	AFgw_C	0.001	AFgw	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R	0.1	AFss_C	0.1	AFss	0.1

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell E5) Symbol	Selected Value
mIURTCE	mIURTCE_R	1.00E-06	mIURTCE_C	0.00E+00	mIURTCE	0.00E+00
IURTCE	IURTCE_R	3.10E-06	IURTCE_C	4.10E-06	IURTCE	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk in selected exposure scenario for the indicated medium
C = Carcinogenic
NC = Non-carcinogenic
I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at:
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

VISL - Calculator - COPC list 10-6

OSWER VAPOR INTRUSION ASSESSMENT
Vapor Intrusion Screening Level (VISL) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (^{o}C)	Tgw	25	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source?	Target Indoor Air Conc. @ TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 1E-06 or THQ = 1	Target Ground Water Conc. @ TCR = 1E-06 or THQ = 1	Is Target Ground Water Conc. < MCL?	Temperature for Groundwater Vapor Conc.	Lower Explosive Limit**	LEL Source	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1
		Cvp > Cia,target?	Chc > Cia,target?	MIN(Cia,c;Cia,nc)		Csg	Cgw	Cgw<MCL?	Tgw or 25	LEL		IUR		RfC		i	Cia,c	Cia,nc
		Yes/No	Yes/No	(ug/m^3)	C/NC	(ug/m^3)	(ug/L)	Yes/No (MCL ug/L)	C	(% by vol)		(ug/m^3)$^{-1}$		(mg/m^3)			(ug/m^3)	(ug/m^3)

S = See RSL User Guide, Section 5
X = PPRTV Appendix
E = The Engineering ToolBox. Available online at http://www.engineeringtoolbox.com/explosive-concentration-limits-d_423.html
N = Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH). Pocket Guide to Chemical Hazards. Available online at: http://www.cdc.gov/niosh/npg/default.html
M = Chemical-specific MSDS
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
**Lower explosive limit is the minimum concentration of the compound in air (% by volume) that is needed for the gas to ignite and explode.

VISL - Calculator BLDG 539

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	3.5E+01	3.50E+00	**2.2E-06**	2.7E-02
x	75-27-4	Bromodichloromethane		--	--	--
x	67-66-3	Chloroform	1.9E+01	1.90E+00	**3.6E-06**	4.4E-03
x	100-41-4	Ethylbenzene		--	--	--

Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
3.70E-05	CA			
2.30E-05	I	9.80E-02	A	
2.50E-06	CA	1.00E+00	I	

VISL-Calculator BLDG 665

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	3.0E+01	3.00E+00	**1.9E-06**	2.3E-02
x	75-27-4	Bromodichloromethane		--	--	--
x	67-66-3	Chloroform		--	--	--
x	100-41-4	Ethylbenzene		--	--	--

Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
3.70E-05	CA			
2.30E-05	I	9.80E-02	A	
2.50E-06	CA	1.00E+00	I	

VISL-Calculator BLDG 670

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	9.9E+01	9.90E+00	**6.3E-06**	7.5E-02
x	75-27-4	Bromodichloromethane	1.0E+01	1.00E+00	**3.0E-06**	No RfC
x	67-66-3	Chloroform	5.8E+01	5.80E+00	**1.1E-05**	1.4E-02
x	100-41-4	Ethylbenzene		--	--	--

Inhalation Unit Risk IUR ($ug/m^3)^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
3.70E-05	CA			
2.30E-05	I	9.80E-02	A	
2.50E-06	CA	1.00E+00	I	

VISL-Calculator BLDG 676

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	1.9E+02	1.90E+01	**1.2E-05**	1.4E-01
x	75-27-4	Bromodichloromethane		--	--	--
x	67-66-3	Chloroform	3.8E+01	3.80E+00	**7.1E-06**	8.9E-03
x	100-41-4	Ethylbenzene	4.8E+02	4.80E+01	**9.8E-06**	1.1E-02

Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
3.70E-05	CA			
2.30E-05	I	9.80E-02	A	
2.50E-06	CA	1.00E+00	I	

VISL-Calculator BLDG 689

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	9.6E+01	9.60E+00	**6.1E-06**	7.3E-02
x	75-27-4	Bromodichloromethane	3.7E+00	3.70E-01	**1.1E-06**	No RfC
x	67-66-3	Chloroform	1.4E+01	1.40E+00	**2.6E-06**	3.3E-03
x	100-41-4	Ethylbenzene	5.2E+01	5.20E+00	**1.1E-06**	1.2E-03

Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
3.70E-05	CA			
2.30E-05	I	9.80E-02	A	
2.50E-06	CA	1.00E+00	I	